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DIPTERA.

VOL. V.

Family CULICIDÆ.

Tribes MEGARHININI and CULICINI.

BY

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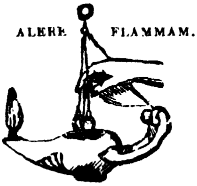
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ASSISTANT-EDITOR'S PREFACE.

THE proposal for the preparation of a volume on Mosquitoes in the 'Fauna of British India' series was first made in 1920, when the late Editor (Sir Arthur Shipley), with the sanction of the Secretary of State for India, arranged with Col. (now Sir) S. R. Christophers and myself to undertake the work. However, at about the same time Capt. P. J. Barraud had received a commission under the Indian Research Fund Association to make a general survey of the mosquitoes of the Indian Empire. In view of this appointment, it appeared undesirable that the proposed volume should be proceeded with until the results of Capt. Barraud's survey were available for inclusion, and publication was therefore deferred. Meanwhile some work which I had already done was published in the form of a synopsis of the Culicine mosquitoes of the Oriental region, and the results of Capt. Barraud's survey were published by him in a series of papers revising the Culicine mosquitoes of India, all of which work appeared in the 'Indian Journal of Medical Research.'

During the course of Capt. Barraud's survey a surprising wealth of new forms was discovered, and the decision to delay publication thus proved amply justified. Moreover, it soon became obvious that it would hardly be possible to include all the new information available in a volume of the ordinary size, at least without undue condensation; it was, therefore, decided to divide the work, issuing one volume on Anopheline and one on Culicine mosquitoes. The former, by Col. Sir Rickard Christophers, was published on November 27th, 1933.

Partly because of pressure of other work, and partly because the far greater share undertaken by Capt. Barraud entitled him to the fullest recognition as author, I preferred to withdraw from joint authorship of the volume on Culicini. Nevertheless my position as assistant-editor has enabled me to take some share in its production, and at the request of the author I have carefully checked, and in a few cases revised, his keys, and, where necessary, supplemented his account from a study of additional material available in the collections of the British Museum. In view of the fact that the volume will no doubt have a wide circulation outside India, it seemed desirable to include some reference to Oriental species which have not yet been found within the Indian area, indicating briefly their distinctions from known Indian forms. This information is usually given in the form of footnotes.

All interpolations made by me in the Author's manuscript are indicated by enclosure within square brackets.

Owing to the necessity of compressing a descriptive account of the adults and early stages of nearly 250 species of Indian Culicine mosquitoes within the limits of a volume of 500 pages, it was decided not to attempt to include an extended introduction, however much this might be desirable. Reference may, however, be made to Sir Rickard Christophers' companion volume on Anophelini, the Introduction to which is largely applicable also to Culicini.

The present volume concludes the account of the Indian Culicinæ, the subfamily which, according to our present classification, includes all the true mosquitoes. For the sake of completeness I have given in an Appendix a brief account of the distinguishing characters of the family Culicidæ and its relationships with other families of Nematocerous Diptera, and also descriptions of the very few Indian members of the other two subfamilies, the Dixinæ and Chaoborinæ.

Nearly all the line drawings, and a large number of the photographic illustrations published by Capt. Barraud in his 'Revision of the Culicine Mosquitoes of India,' are reproduced here on a smaller scale, permission to copy having been kindly granted by the Secretary of the Scientific Advisory Board of the Indian Research Fund Association.

In addition to previously published illustrations, a large number of new figures have been specially prepared for this volume. Some of these are the work of the Author, but the majority are by Mr. A. J. E. Terzi, whose fine work is its own recommendation.

Mr. S. Maulik has kindly assisted in reading the proofs, and has checked the spelling of the place-names so as to ensure uniformity with that adopted in the Indian Post Office Guide.

In spite of the vast increase in our knowledge of Indian mosquitoes within the past twenty years—an increase through which the Culicidæ have become one of the best-known groups of insects in the Indian fauna—a great deal of work remains to be done before our knowledge even approaches completeness. As will be noted from Capt Barraud's account, the larvæ of 96 of the 239 described Indian Culicini are still unknown, and regarding the distribution of these and others within the area our information is very meagre. Little or no collecting has yet been done in some areas, notably Tenasserim and parts of central India, and even in the areas where most work has been accomplished there can be little doubt that new species await discovery.

It has sometimes been remarked that mosquitoes can be divided into two main groups: those which are found only as adults, and those found only as larvæ. The truth behind this remark is that the breeding-places of some of the common domestic species are easily overlooked, whereas many species of which the larvæ are easily found are not aggressive blood-suckers. The adult mosquitoes which obtrude themselves on our notice are by now fairly well known, but this cannot yet be said of the many "wild" species which seldom enter dwellings, whose breeding-places are, nevertheless, not difficult to discover. The most likely habitats in which to search for larvæ of hitherto undescribed species are the small collections of water to be found in various plants. Much attention has been paid to the tree-hole and bamboo fauna, particularly in the Himalayan region, and many remarkable discoveries have been made. Some other types of breeding-place, however, have been but little investigated, partly, perhaps, because few or no Anophelini are to be found in them. For example, in the Malayan region many Culicine mosquitoes are found breeding in the water contained in the leaves of pitcher-plants (*Nepenthes*), in leaf-axils of *Colocasia*, *Crinum*, *Pandanus*, and *Susum*, and in flowers or inflorescences of *Cyrtandra*, *Hymenocallis*, and *Rafflesia*. Many species of mosquitoes are more or less confined to such situations, the adults being rarely seen unless the larvæ are collected and reared. No doubt the number of water-bearing plants is higher in the Malayan than the Indian region, but the genera *Colocasia*, *Crinum*, and *Nepenthes* are widely distributed in India and Ceylon, and should repay investigation.

F. W. EDWARDS.

London,
February 1934.

AUTHOR'S PREFACE

This volume embodies the results of several years' work on the Megarhinine and Culicine mosquitoes of India which the writer has been able to carry out whilst employed under the Indian Research Fund Association. The Author wishes to express his sincere thanks to Colonel Sir Rickard Christophers, Kt., C.I.E., O.B.E., F.R.S. (I.M.S., retired), for initiating an inquiry into this subject, and for much help and encouragement over a period of many years. The Author is also greatly indebted to Dr. F. W. Edwards, of the British Museum (Natural History), for kind assistance in many ways, especially in editing the manuscript of this work, arranging for a number of the illustrations, and in lending his MSS. of the 'Genera Insectorum, Family Culicidæ,' before publication. The Author's thanks are also due to Lieut.-Colonel J. A. Sinton, V.C., O.B.E., I.M.S., Director of the Malaria Survey of India, for much kind assistance and advice, and to many others, both in India and other countries, for the gift or loan of valuable material.

Full use has been made of publications by other writers. the titles of which will be found in the list of references.

Endeavour has been made to bring the subject up to date, but there is little doubt that many additional species of the Culicini still await discovery, especially in the south-western part of the Peninsula and in Burma. It is interesting to look back to 1900, when Colonel G. M. Giles, I.M.S., in reading a paper before the Bombay Natural History Society, stated that " Two years ago, when I took up the task of collecting the literature of the Culicidæ, it is an actual fact that no more than four species were recorded as having been found in all India. There was, in fact, hardly any other known country with such scanty records of the subject. The subjoined list includes 32 species, and I have little doubt the final total of species will be found to be not far off a hundred, as new species are constantly turning up."

The number (including 43 Anophelini) has now reached a total of 288, of the three tribes included in the subfamily Culicinæ, not counting named varieties, some of which may eventually be shown to be distinct species. The larvæ of about 40 species of the Culicini are here described for the first time, but those of many others remain unknown.

With very few exceptions the Author has been able to examine adult specimens of all species. In the records of distribution the localities from which the Author has examined specimens are marked with an asterisk.

P. J. BARRAUD.

Kasauli,
July 1933.

BIBLIOGRAPHY.

ACTON, H. W., and RAO, S. S. 1931.—The Diagnosis of Lymphatic Obstruction of Filarial Origin. Ind. Med. Gaz. lxvi, pp. 11–17.

ANNANDALE, N. 1911.—A new Genus of Short-beaked Gnats from Ceylon. Spolia Zeylanica, vii, pp. 187–193.

BACOT, A. W. 1916.—Yellow Fever Commission (W. Africa). Ent. Rept., pp. 130 & 142.

BARRAUD, P. J. 1920.—Notes on some Culicidæ collected in Lower Mesopotamia. Bull. Ent. Res. x, pp. 323–325.

—— 1921.—Mosquitoes collected in Palestine and Adjacent Territories. *Ibid.* xi, pp. 387–395.

—— 1923 *a*.—A Revision of the Culicine Mosquitoes of India.—I. *Stegomyia* and *Christophersiomyia*. Ind. Journ. Med. Res. x, pp. 772–788.

—— 1923 *b*.—Some new Culicine Mosquitoes found in India, and a Note on *Finlaya assamensis* (Theo.). Bull. Ent. Res. xiii, pp. 405–408.

—— 1923 *c*.—A Revision of the Culicine Mosquitoes of India.—II. The Larvæ of some Indian Species of *Culex*. Ind. Journ. Med. Res. x, pp. 934–942.

—— 1923 *d*.—A Revision of the Culicine Mosquitoes of India.—III. Notes on certain Species of the Genus *Finlaya* and Descriptions of new Species. *Ibid.* xi, pp. 214–219.

—— 1923 *e*.—A Revision of the Culicine Mosquitoes of India.—IV. The Larvæ of some Indian Species of *Finlaya*. *Ibid.* xi, pp. 220–223.

—— 1923 *f*.—A Revision of the Culicine Mosquitoes of India.—V. Further Notes on the Genera *Stegomyia* and *Finlaya*, with Descriptions of new Species. *Ibid.* xi, pp. 224–228.

—— 1923 *g*.—A Revision of the Culicine Mosquitoes of India.—VI. Some Indian Species of the Genus *Finlaya*. *Ibid.* xi, pp. 475–493.

—— 1923 *h*.—A Revision of the Culicine Mosquitoes of India.—VII. The Larvæ of some Species of *Stegomyia*, *Christophersiomyia*, *Mimomyia*, and *Aëdomyia*. *Ibid.* xi, pp. 495–505.

—— 1923 *i*.—Two new Species of *Culex* from Assam. *Ibid.* xi, pp. 507–509.

—— 1924 *a*.—A Revision of the Culicine Mosquitoes of India.—VIII. Further Descriptions of Indian Species of *Finlaya*. *Ibid.* xi, pp. 845–865.

—— 1924 *b*.—A new Mosquito from Kashmir. *Ibid.* xi, pp. 967–968.

—— 1924 *c*.—A Revision of the Culicine Mosquitoes of India.—IX. The Indian Species of *Lutzia*. *Ibid.* xi, pp. 971–976.

BARRAUD, P. J. 1924 *d.*—A Revision of the Culicine Mosquitoes of India.—X. The Larvæ of Indian Species of *Lutzia.* Ind. Journ. Med. Res. xi, pp. 977–978.

—— 1924 *e.*—A Revision of the Culicine Mosquitoes of India.—XI. Some Indian Species of *Culex.* *Ibid.* xi, pp. 979–998.

—— 1924 *f.*—Four new Mosquitoes from the Western Himalayas· *Ibid.* xi, pp. 999–1006.

—— 1924 *g.*—A Revision of the Culicine Mosquitoes of India.—XII. Further Descriptions of Indian Species of *Culex*, including two new Species. *Ibid.* xi, pp. 1259–1274.

—— 1924 *h.*—A Revision of the Culicine Mosquitoes of India.—XIII. Further Descriptions of Indian Species of *Culex*, including three new Species. *Ibid.* xi, pp. 1275–1282.

—— 1924 *i.*—A Revision of the Culicine Mosquitoes of India.—XIV. The Indian Species of the Subgenus *Culiciomyia* (Theo.) Edw., including one new Species. *Ibid.* xii, pp. 15–22.

—— 1924 *j.* A Revision of the Culicine Mosquitoes of India.—XV. The Indian Species of the Subgenus *Lophoceratomyia* (Theo.) Edw., including two new Species. *Ibid.* xii, pp. 39–46.

—— 1924 *k.*—A new Mosquito from Kashmir and the North-West Frontier Province. *Ibid.* xii, pp. 73–74.

—— 1924 *l.*—A Revision of the Culicine Mosquitoes of India.—XVI. The Indian Species of *Theobaldia.* *Ibid.* xii, pp. 139–143.

—— 1924 *m.*—A Revision of the Culicine Mosquitoes of India.—XVII. Further descriptions of the Larvæ of Indian Species of *Culex.* *Ibid.* xii, pp. 427–434.

—— 1926.—A Revision of the Culicine Mosquitoes of India.—XVIII. The Indian Species of *Uranotænia* and *Harpagomyia*, with Descriptions of five new Species. *Ibid.* xiv, pp. 331–350.

—— 1927 *a.*—A Revision of the Culicine Mosquitoes of India.—XIX. The Indian Species of *Aëdomyia* and *Orthopodomyia*, with Descriptions of two new Species. *Ibid.* xiv, pp. 523–532.

—— 1927 *b.*—A Revision of the Culicine Mosquitoes of India.—XX. The Indian Species of *Armigeres* (including *Leicesteria*), with Descriptions of two new Species. *Ibid.* xiv, pp. 533–548.

—— 1927 *c.*—A Revision of the Culicine Mosquitoes of India.—XXI. Descriptions of new Species of *Aëdimorphus* and *Finlaya*, and Notes on *Stegomyia albolineata.* *Ibid.* xiv, pp. 549–554.

—— 1927 *d.*—A Revision of the Culicine Mosquitoes of India.—XXII. The Indian Species of *Tæniorhynchus* (including *Mansonioides*), with a Description of one new Species. *Ibid.* xiv, pp. 555–563.

—— 1928 *a.*—A Revision of the Culicine Mosquitoes of India.—XXIII. The Genus *Aëdes* (sens. lat.) and Classification of Subgenera. Descriptions of Indian Species of *Aëdes* (*Aëdimorphus*), *Aëdes* (*Ochlerotatus*), and *Aëdes* (*Banksinella*), with Notes on *Aëdes* (*Stegomyia*) *variegatus.* *Ibid.* xv, pp. 653–669.

—— 1928 *b.*—A Revision of the Culicine Mosquitoes of India.—XXIV. The Indian Species of the Subgenera *Skusea* and *Aëdes*, with Descriptions of eight new Species and Remarks on a new Method for identifying the Females of the Subgenus *Aëdes.* *Ibid.* xvi, pp. 357–375.

—— 1928 *c.*—The Distribution of "*Stegomyia fasciata*" in India, with Remarks on Dengue and Yellow Fever. *Ibid.* xvi, pp. 377–388.

BARRAUD, P. J. 1929 *a*.—A Revision of the Culicine Mosquitoes of India.—XXV. The Genera *Mucidus*, *Mimomyia*, *Ficalbia*, *Rachionotomyia*, and *Hodgesia*. Ind. Journ. Med. Res. xvi, pp. 1052–1063.

—— 1929 *b*.—A Revision of the Culicine Mosquitoes of India.—XXVI. The Genera *Heizmannia*, *Hæmagogus*, *Topomyia*, and *Megarhinus*. *Ibid.* xvii, pp. 259–280.

—— 1931 *a*.—The Early Stages of some Indian Mosquitoes: *Megarhinus*. *Ibid.* xviii, pp. 1127–1132.

—— 1931 *b*.—Notes on some Indian Mosquitoes of the Subgenus *Stegomyia*, with Descriptions of new Species. *Ibid.* xix, pp. 221–227.

—— 1931 *c*.—Descriptions of Eight new Species of Indian Culicine Mosquitoes. *Ibid.* xix, pp. 609–616.

—— 1932.—The Early Stages of some Indian Mosquitoes: *Orthopodomyia*. *Ibid.* xix, pp. 1013–1017.

BARRAUD, P. J., and COVELL, G. 1927.—The Morphology of the Buccal Cavity of the Mosquito. Trans. Far East Assoc. Trop. Med., 7th Congress, iii, pp. 98–102.

—— 1928.—The Morphology of the Buccal Cavity in Anopheline and Culicine Mosquitoes. Ind. Journ. Med. Res. xv, pp. 671–679.

BEDFORD, G. A. H. 1919.—New Culicine Larvæ from the Transvaal. U.S. Afr. Dept. Agric., 5th & 6th Repts. Vet. Res. pp. 739–743.

—— 1928.—South African Mosquitoes. U.S. Afr. Dept. Agric., 13th & 14th Repts. Vet. Res. pp. 883–990.

BONNE-WEPSTER, J. 1930.—The Genus *Tæniorhynchus* in the Dutch East Indies. Meded. Volks. Ned.-Ind. xix. Part I. *Mansonioides*, pp. 196–212. Part II. *Coquillettidia*, pp. 387–399. [Also in Dutch in Geneesk. Tijd. Ned.-Ind. (9) lxx.]

—— 1932 *a*.—A Mosquito with Larval Habits like *Tæniorhynchus*. Bull. Ent. Res. xxiii, pp. 69–72.

—— 1932 *b*.—Over symbiosen tusschen muskieten-larvan in Waterplanten. Tijd. v. Ent. lxxv, pp. 254–258.

BONNE-WEPSTER, J., and BRUG, S. L. 1932.—The Subgenus *Stegomyia* in Netherland India. Geneesk. Tijd. v. Ned.-Ind. Bijblad ii, pp. 39–119.

BOREL, E. 1926.—Les moustiques de la Cochinchine et du Sud-Annam. Arch. Inst. Pasteur d'Indochine, nos. 3 & 4, pp. 75–121.

—— 1927.—Nomenclature des moustiques de la Cochinchine et du Sud-Annam. Trans. Far East Assoc. Trop. Med., 7th Congress, iii, p. 165.

—— 1928 *a*.—Les moustiques de la Cochinchine et du Sud-Annam. *Aëdes*. Arch. Inst. Pasteur d'Indochine, no. 7, pp. 75–106.

—— 1928 *b*.—Les moustiques de la Cochinchine et du Sud-Annam.—III. *Aëdes* (*Finlaya*). *Ibid.* no. 8, pp. 41–76.

BOREL, E., and LABERNADIE, V. G. F. 1929.—A List of Species of Mosquitoes collected in the French Settlements in India. Ind. Med. Gaz. lxiv, p. 495.

BROLEMANN, H. W. 1919.—Sur quelques *Culex* des Pyrénés.—II. Campagne 1918. Ann. Soc. Ent. France, lxxxviii, pp. 65–103.

BROOKE, G. E. 1922.—Tentative Table for the Diagnosis of Malayan Culicidæ. Govt. Health Dept. Straits Settlements, Serv. Publ. no. 2.

Brug, S. L. 1924 *a*.—Notes on Dutch East Indian Mosquitoes. Bull. Ent. Res. xiv, pp. 433–442.

—— 1924 *b*.—De Voornaamste Ned.-Indische Culicinen. Weltevreden.

—— 1926.—The Geographical Distribution of Mosquitoes in the Malayan Archipelago. Meded. Volks. Ned.-Ind. (Foreign Ed.), pp. 471–482.

—— 1931 *a*.—Filariasis in the Dutch East Indies. Proc. Roy. Soc., Med. Sec., Trop. Dis. & Parasit. xxiv, pp. 23–33.

—— 1931 *b*.—Culiciden der Deutschen Limnologischen Sunda-Expedition. Arch. Hydrobiol. Suppl.-Bd. ix, pp. 1–42.

—— 1932 *a*.—Notes on Dutch East Indian Mosquitoes. Bull. Ent. Res. xxiii, pp. 73–83.

—— 1932 *b*.—Berichtigung zu meiner Arbeit "Culiciden" der Deutschen Limnologischen Sunda-Expedition. Arch. Hydrobiol. Supp.-Bd. xi, pp. 399–400.

Brunetti, E. 1907.—Annotated Catalogue of Oriental Culicidæ. Rec. Ind. Mus. i, pp. 297–377.

—— 1912.—Annotated Catalogue of Oriental Culicidæ. Suppl. Rec. Ind. Mus. iv, pp. 403–516.

—— 1914.—Critical Review of the Genera in Culicidæ. Rec. Ind. Mus. x, pp. 15–73.

—— 1920.—Catalogue of Oriental and South Asiatic Nemocera. *Ibid.* xvii, pp. 1–300.

Buxton, P. A., and Hopkins, G. H. E. 1925.—The Early Stages of Samoan Mosquitoes. Bull. Ent. Res. xv, pp. 295–301.

—— 1927.—Researches in Polynesia and Melanesia.—Parts I.–IV. Pp. 1–260. London Sch. Hyg. & Trop. Med.

Carter, H. F. 1910.—Report on a Collection of Culicidæ from Cochin China. Entomologist, xliii, pp. 274–276.

Christophers, S. R. 1906.—On the Importance of Larval Characters in the Classification of Mosquitoes. Sci. Mem. Med. & San. Depts. India, New Series, no. 25, pp. 1–18.

—— 1911.—A new Culicine: *Leslieomyia tæniorhynchoides*, nov. gen. et sp. Paludism, ii, pp. 68–72.

—— 1922.—The Development and Structure of the Terminal Abdominal Segments and Hypopygium of the Mosquito, with Observations on the Homologies of the Terminal Segments of the Larva. Ind. Journ. Med. Res. x, pp. 530–572.

—— 1923.—The Structure and Development of the Female Genital Organs and Hypopygium of the Mosquito. *Ibid.* x, pp. 698–720.

Christophers, S. R., and Barraud, P. J. 1923.—Descriptive Terminology of Male Genitalic Characters of Mosquitoes. *Ibid.* x, pp. 827–835.

Connal, S. L. M. S. 1927.—On the Variations occurring in *Aëdes argenteus* in Lagos, Nigeria. Bull. Ent. Res. xviii, pp. 5–11.

Cooling, L. E. 1924.—The Larval Stages and Biology of the commoner Species of Australian Mosquitoes. Commonwealth Austr. Dept. Health, Serv. Publ. (Trop. Div.) no. 8, pp. 1–40.

Cruikshank, J. A., and Wright, R. E. 1914.—Filariasis in Cochin. Ind. Journ. Med. Res. i, pp. 741–785.

Dover, C. 1928.—Notes on the Fauna of Pitcher-plants from Singapore Island. Journ. Mal. Br. R. As. Soc. vi, pt. 3, pp. 1–27.

Dyar, H. G. 1920.—A Collection of Mosquitoes from the Philippine Islands. Insec. Insc. Mens. viii, pp. 175–186.

——. 1921.—Two new Mosquitoes from China. *Ibid.* ix, pp. 147–148.

——. 1925.—Note on the Male of *Aëdes punctifemora* Ludlow. *Ibid.* xiii, p. 217.

—— 1928.—The Mosquitoes of the Americas. Carnegie Inst., Washington.

Dyar, H. G., and Shannon, R. C. 1925.—The Types of Philippine Mosquitoes described by Ludlow, and other Notes on the Fauna. Insec. Insc. Mens. xiii, pp. 66–89.

Edwards, F. W. 1911.—The African Species of *Culex* and Allied Genera. Bull. Ent. Res. ii, pp. 241–266.

—— 1912 *a*.—A Synopsis of the Species of African Culicidæ other than *Anopheles*. *Ibid.* iii, pp. 1–53.

—— 1912 *b*.—Revised Keys to the known Larvæ of African Culicinæ. *Ibid.* iii, pp. 373–385.

—— 1913 *a*.—Further Notes on African Culicidæ. *Ibid.* iv, pp. 47–59.

—— 1913 *b*.—New Synonymy in Oriental Culicidæ. *Ibid.* iv, pp. 221–242.

—— 1913 *c*.—Tipulidæ and Culicidæ from the Lake of Tiberias and Damascus. Journ. Proc. Asiatic Soc. Bengal, ix, pp. 47–51.

—— 1914 *a*.—On the Oriental Culicid Genus *Leicesteria*. Bull. Ent. Res. iv, pp. 255–263.

—— 1914 *b*.—New Species of Culicidæ in the British Museum, with Notes on the Genitalia of some African *Culex*. *Ibid.* v, pp. 63–81.

—— 1914 *c*.—New Culicidæ from Borneo and Hong Kong. *Ibid.* v, pp. 125–128.

—— 1915 *a*.—New and little-known East African Culicidæ. *Ibid.* v, pp. 273–281.

—— 1915 *b*.—Diagnoses of new Bornean Culicidæ. *Ibid.* v, pp. 283–285.

—— 1916.—Eight new Mosquitoes in the British Museum Collection. *Ibid.* vi, pp. 357–364.

—— 1917.—Notes on Culicidæ, with Descriptions of new Species. *Ibid.* vii, pp. 201–229.

—— 1920 *a*.—Mosquito Notes. *Ibid.* x, pp. 129–137.

—— 1920 *b*.—The Nomenclature of the Parts of the Male Hypopygium of Diptera Nematocera, with special reference to Mosquitoes. Ann. Trop. Med. & Parasit. xiv, pp. 23–40.

—— 1921 *a*.—H. Sauter's Formosan collections: Culicidæ. Ann. & Mag. Nat. Hist. (9) viii, pp. 629–632.

—— 1921 *b*.—Mosquito Notes.—II. Bull. Ent. Res. xii, pp. 69–80.

—— 1921 *c*.—A Revision of the Mosquitoes of the Palæarctic Region. Bull. Ent. Res. xii, pp. 263–351.

—— 1922 *a*.—A Revision of the Genus *Harpagomyia*. Trans. Ent. Soc. London, January, pp. 496–503.

—— 1922 *b*.—Mosquito Notes.—II. Bull. Ent. Res. xiii, pp. 75–102.

—— 1922 *c*.—A Synopsis of Adult Oriental Culicine Mosquitoes.—Part 1. Ind. Journ. Med. Res. x, pp. 249–293.

—— 1922 *d*.—A Synopsis of Adult Oriental Culicine Mosquitoes.—Part 2. *Ibid.* x, pp. 430–475.

Edwards, F. W. 1923.—Mosquito Notes.—IV. Ind. Journ. Med. Res. xiv, pp. 1–9.

—— 1924.—A Synopsis of the Adult Mosquitoes of the Australian Region. *Ibid.* xiv, pp. 351–401.

—— 1925 *a*.—Mosquito Notes.—V. *Ibid.* xv, pp. 257–270.

—— 1925 *b*.—Diptera Nematocera from the Dutch East Indies. Treubia, vi, pp. 154–172.

—— 1925 *c*.—Fauna Buruana : Culicidæ. *Ibid.* vii, p. 40.

—— 1926 *a*.—Mosquito Notes.—VI. Bull. Ent. Res. xvii, pp. 101–131.

—— 1926 *b*.—Una revisione delle zanzare delle regioni Paleartiche. Riv. Malar. v, pp. 253–285, 392–466, 613–652.

—— 1928 *a*.—Mosquito Notes.—VII. Bull. Ent. Res. xviii, pp. 267–284.

—— 1928 *b*.—Diptera Nematocera from the Federated Malay States. Museums. Journ. F.M.S. Mus. xiv, pp. 1–139.

—— 1929 *a*.—Philippine Nematocerous Diptera.—Part 2. Not. Ent. ix, pp. 1–14.

—— 1929 *b*.—Mosquito Notes.—VIII. Bull. Ent. Res. xx, pp. 321–343.

—— 1930 *a*.—Mosquito Notes.—IX. *Ibid.* xxi, pp. 287–306.

—— 1930 *b*.—Mosquito Notes.—X. *Ibid.* xxi, pp. 541–545.

—— 1930 *c*.—Notes on Exotic Chaoborinæ, with Descriptions of new Species (Diptera, Culicidæ). Ann. & Mag. Nat. Hist. (10) vi, pp. 527–540.

—— 1931.—Mosquitoes breeding in Plant Pitchers. Nat. Hist. Mag. iii, pp. 25–28.

—— 1932.—Genera Insectorum. Fasc. cxciv.—Family Culicidæ. Brussels.

Edwards, F. W., and **Given**, D. H. C. 1928.—The early Stages of some Singapore Mosquitoes. Bull. Ent. Res. xviii, pp. 337–357.

Evans, A. M. 1929.—Descriptions of the early Stages of two further Mosquitoes collected in Southern Nigeria by Mr. L. H. Dunn. Ann. Trop. Med. & Parasit. xxiii, pp. 407–413.

Farquharson, C. O. 1918–19.—*Harpagomyia* and other Diptera fed by *Cremastogaster* Ants in Southern Nigeria. Proc. Ent. Soc. London, 1918, pp. xxix–xxxix.

Ficalbi, E. 1897.—Revisione sistematica delle specie Europee della Famiglia delle Culicidæ. Bull. Soc. Ent. Ital. xxviii, pp. 197–313.

—— 1899.—Venti specie di zanzare (Culicidæ) Italiane. *Ibid.* xxxi, pp. 46–234.

Galliard, H. 1927.—Note sur les Culicines de Corse. Ann. Parasit. hum. & comp. pp. 97–104.

Gil Collado, J. 1930.—Datos actuales sobre la distribucion geografica de los culicidos espanoles. Eos, Rev. Españ. Ent. vi, pp. 329–347.

Giles, G. M. 1900.—A Handbook of Gnats or Mosquitoes. 1st Ed. London.

—— 1901 *a*.—A Plea for the Collective Investigation of Indian Culicidæ, with suggestions as to moot points for enquiry, and a Prodromus of Species known to the Author. Journ. Bomb. Nat. Hist. Soc. xiii, pp. 592–610.

—— 1901 *b*.—Six new Species of Culicidæ from India. Entomologist, xxxiv, pp. 192–197.

—— 1902.—A Handbook of Gnats or Mosquitos. 2nd Ed. London.

GILES, G. M. 1903.—Notes on the Culicidæ of Dehra Dun, with a Description [by Giles] of a new *Mansonia* which mimics *Anopheles*. By Major F. Wyville Thomson ; communicated by G. M. Giles. Journ. Trop. Med. vi, p. 315.

—— 1904.—Notes on some Mosquitoes, etc., received from the Philippine Islands and Angola, with some incidental remarks upon Classification. *Ibid.* vii, pp. 366–369.

GRAHAM, W. M. 1911.—Results obtained from a Monthly Examination of the Native Domestic Water Receptacles at Lagos, Southern Nigeria, in 1910–1911. Bull. Ent. Res. ii, pp. 127–139.

GREEN, E. E. 1905.—On *Toxorhynchites immisericors*, the Elephant Mosquito. Spol. Zeyl. ii, pp. 159–164.

GUENTHER, K. 1913.—Die lebenden Bewohner der Kannen der insektenfressenden Pflanze *Nepenthes distillatoria* auf Ceylon. Zeitschr. für wissens. Insekten-Biol. ix, pp. 198–207 & 259–270.

HAGA, J. 1924.—Aanteekening omtrent muskieten (II). Geneesk. Tijd. Ned.-Ind. (5) lxiv, pp. 1–20 (sep.).

HILL, G. F. 1925.—The Distribution of Anopheline Mosquitoes in the Australian Region, with Notes on some Culicine Species. Proc. Roy. Soc. Vic. xxxvii, pp. 61–77.

HINDLE, E. 1929.—An experimental Study of Yellow Fever. Trans. Roy. Soc. Trop. Med. & Hyg. xxii, pp. 405–434.

HOWARD, L. O., DYAR, H. G., and KNAB, F. 1912.—The Mosquitoes of North and Central America and the West Indies. Washington. (I. Structure & Bionomics ; II. Plates.)

—— 1915.—The Mosquitoes of North and Central America and the West Indies.—III. (Systematic : Part 1.)

—— 1917.—The Mosquitoes of North and Central America and the West Indies.—IV. (Systematic : Part 2.)

INGRAM, A. 1912.—Notes on the Mosquitoes observed at Bole, Northern Territories, Gold Coast. Bull. Ent. Res. iii, pp. 73–78.

INGRAM, A., & MACFIE, J. W. S. 1917 *a*.—Notes on some distinctive Points in the Pupæ of West African Mosquitoes. *Ibid.* viii, pp. 73–91.

—— 1917 *b*.—The early Stages of certain West African Mosquitoes. *Ibid.* viii, pp. 135–154.

—— 1919.—The early Stages of West African Mosquitoes.—IV. *Ibid.* x, pp. 59–69.

INGRAM, A., & DE MEILLON, B. 1927.—A Mosquito Survey of certain Parts of Southern Africa, with special reference to the Carriers of Malaria and their Control. Pub. S. Afr. Inst. Med. Res. no. 22, pp. 1–81.

IYENGAR, M. O. T. 1932.—Filariasis in North Travancore. Ind. Journ. Med. Res. xx, pp. 671–672.

JACOBSON, E. 1909 *a*.—Ameisen aus Java und Krakatau.—II. Biologischer Theil. Notes Leyden Museum, xxxi, p. 246.

—— 1909 *b*.—Ein Moskito als Gast. Tijd. v. Ent. lii, pp. 158–164.

—— 1911.—Nahere Mitteilungen über die myrmecophilen Culicide *Harpagomyia splendens*. *Ibid.* liv, pp. 158–161.

JAMES, S. P. 1900.—On the Metamorphosis of the *Filaria sanguinis hominis* in Mosquitoes etc. Ind. Med. Gaz. Sept. pp. 340–343.

—— 1914.—Summary of a Year's Mosquito Work in Colombo. Ind. Journ. Med. Res. ii, pp. 227–266.

Joyeux, C. 1918.—Note sur les Culicides de Macédoine. Bull. Soc. Path. Exot. xi, pp. 530–547.

Kirkpatrick, T. W. 1925.—The Mosquitoes of Egypt. Pp. 1–224. Cairo.

Korke, V. T. 1928.—Observations on Filariasis in some Areas in British India. Ind. Journ. Med. Res. xvi, pp. 187–198 & 695–715.

—— 1929.—Observations on the Atypical Variety of *bancrofti* and its Significance. *Ibid.* xvi, pp. 1023–1031.

—— 1930 *a.*—Observations on the Correlation between the Incidence of Filarial Infection in the Human Host and in the Carrier in relation to the Terrain. *Ibid.* xviii, pp. 319–331.

—— 1930 *b.*—Observations on the Characters of Filarial Endemic Areas in Bihar and Orissa. *Ibid.* xviii, pp. 333–336.

—— 1930 *c.*—Observations on the Natural History of *Filaria bancrofti* in Dwellings in relation to the Systems of Drainage. *Ibid.* xviii, pp. 427–442.

—— 1932.—Observations on Filariasis in some Areas in British India. *Ibid.* xx, pp. 335–339.

Kumm, H. W. 1931 *a.*—Studies on *Aëdes* Larvæ in South-Western Nigeria, etc. Bull. Ent. Res. xxii, pp. 65–74.

—— 1931 *b.*—Geographical Distribution of Yellow Fever Vectors. Amer. Journ. Hyg. Mono. ser. no. 12, pp. 1–110.

Lang, W. D. 1920.—A Handbook of British Mosquitoes. British Museum.

Langeron, M. 1918.—Morphologie et biologie de la larve de *Theobaldia spathipalpos*. Bull. Soc. Path. Exot. xi, pp. 98–103.

Leicester, G. F. 1904 (in F. V. Theobald).—New Culicidæ from the Federated Malay States. Entomologist, xxxvii, pp. 236–239.

—— 1908.—The Culicidæ of Malaya. Studies from Inst. Med. Res. F.M.S. iii, pp. 18–261.

Ludlow, C. S. 1904 *a.*—Mosquito Notes. Can. Ent. xxxvi, pp. 233–236.

—— 1904 *b.*—Mosquito Notes.—2. *Ibid.* xxxvi, pp. 297–301.

—— 1905 *a.*—Mosquito Notes.—3. *Ibid.* xxxvii, pp. 94–102.

—— 1905 *b.*—Mosquito Notes.—3 (*cont.*). *Ibid.* xxxvii, pp. 129–135.

—— 1905 *c.*—Mosquito Notes.—4. *Ibid.* xxxvii, pp. 385–388.

—— 1906.—Mosquito Notes.—5. *Ibid.* xxxviii, pp. 360–368.

—— 1907.—Mosquito Notes.—5 (*cont.*). *Ibid.* xxxix, pp. 413–414.

—— 1910.—Mosquito Observations. *Ibid.* xlii, pp. 193–196.

Macfarlane, H. 1915.—The *Stegomyia* Survey in Hong Kong. Bull. Ent. Res. vi, pp. 67–68.

Macfie, J. W. S. 1914.—A Note on the Action of Common Salt on the Larvæ of *Stegomyia fasciata*. *Ibid.* iv, pp. 339–344.

—— 1915.—Observations on the Bionomics of *Stegomyia fasciata*. *Ibid.* vi, pp. 205–229.

—— 1917.—Morphological Changes observed during the Development of the Larva of *Stegomyia fasciata*. Bull. Ent. Res. vii, pp. 297–307.

—— 1920 *a.*—The Chætotaxy of the Pupa of *Stegomyia fasciata*. *Ibid.* x, pp. 161–169.

—— 1920 *b.*—The Early Stages of West African Mosquitoes.—V. (contains Observations on Chætotaxy of Pupa of *Culex*). *Ibid.* xi, pp. 105–112.

MACFIE, J. W. S., and INGRAM, A. 1916 *a*.—New Culicine Larvæ from the Gold Coast. *Ibid.* vii, pp. 1–18.

—— 1916 *b*.—The Domestic Mosquitoes of Accra. *Ibid.* vii, pp. 161–177.

—— 1922.—On the Genital Armature of the Female Mosquito. Ann. Trop. Med. & Parasit. xvi, pp. 157–188.

—— 1923.—The Early Stages of West African Mosquitoes.—VI. Bull. Ent. Res. xiii, pp. 409–442.

MACGREGOR, M. E. 1916.—Resistance of the Eggs of *Stegomyia fasciata* to Conditions adverse to Development. *Ibid.* vii, pp. 81–85.

MARTINI, E. 1923.—Über einige für das System bedeutungsvolle Merkmale der Stechmücken. (Haarstellung der Larven, männliche Geschlechtsorgane, Kiefertaster.) Zool. Jahrb. Abt. f. System. no. 6, pp. 517–590.

—— 1929–31 (in Erwin Lindner).—Die Fliegen der paläarktischen Region. Culicidæ. Pp. 1–144 (1929), 145–320 (1930), 321–398 (1931).

MEGAW, J. W. D. 1923.—The Dengue-Sandfly-Fever Problem. Ind. Med. Gaz. lviii, pp. 401–406.

MEGAW, J. W. D., and GUPTA, J. S. 1927.—The Geographical Distribution of some of the Diseases of India. *Ibid.* lxii, pp. 299–313.

DE MEIJERE, J. C. H. 1909.—Drei myrmecophile Dipteren aus Java. Tijd. v. Ent. lii, pp. 165–174.

——. 1910.—*Nepenthes*-Tiere.—I. Systematik. Ann. Jard. Bot. Buitenzorg (2), Supp. iii, pp. 917–940.

——. 1911.—Zur metamorphose der myrmecophilen Culicide *Harpagomyia splendens*. Tijd. v. Ent. liv, pp. 162–167.

DE MEILLON. 1928.—Notes on some Mosquitoes found in South Africa. —I. S. Afr. Journ. Sci. xxv, pp. 316–324.

MONTCHADSKY, H. S. 1926.—Larva of *Aëdes* (*O.*) *pulchritarsis*, Rond., var. *stegomyina*, Stack. & Montch., nov., from Turkestan. Bull. Ent. Res. xvii, pp. 151–157.

MONTSCHADSKY, A. 1930.—Die Stigmalplatten der Culiciden-Larven. Zool. Jahrb. Syst. lviii, pp. 541–636.

NEVEU-LEMAIRE, M. 1905.—Mission du bourg de Bozas. Description d'une nouvelle espèce de *Stegomyia* receullie par le Dr. Brumpt à Harar. Bull. Soc. Zool. France, xxx, pp. 8–11.

NOÉ, G. 1899.—Contribuzione allo studio dei Culicidi. Bull. Soc. Ent. Ital. xxxi. pp. 235–262.

PAINE, R. W., and EDWARDS, F. W. 1929.—Mosquitoes from the Solomon Islands. Bull. Ent. Res. xx, pp. 303–316.

PAIVA, C. A. 1910.—Notes on the Larva of *Toxorhynchites immisericors*. Rec. Ind. Mus. v, pp. 187–190.

—— 1912.—Materials for a Survey of the Mosquitoes of Calcutta. *Ibid.* vii, pp. 93–98.

PATTON, W. S. 1905.—The Culicid Fauna of the Aden Hinterland, their Haunts and Habits. Journ. Bomb. Nat. Hist. Soc. xvi, pp. 623–637.

PEUS, F. 1933.—Zur Kenntnis der *Aëdes*-Arten des deutschen Faunengebietes (Dipt., Culicid.). Die Weibchen der *Aëdes communis*-Gruppe. Konowia, xii, pp. 145–159.

PRASHAD, BAINI. 1915.—Male Generative Organs of some Indian Mosquitoes. Ind. Journ. Med. Res. iii, pp. 497–502.

PRASHAD, BAINI. 1918.—Contributions to the Anatomy of Aquatic Diptera.—I. Larval and Pupal Stages of an Indian *Chaoborus* and *Dixa*. Rec. Ind. Mus. xv, pp. 153–158.

RAO, S. S., and IYENGAR, M. O. T. 1930.—Studies on the Influence of Season on the Development of *Filaria bancrofti* in *Culex fatigans*. Ind. Journ. Med. Res. xvii, pp. 759–768.

——. 1932.—Experimental Infection of some Indian Mosquitoes with *Wuchereria* (*Filaria*) *bancrofti*. *Ibid.* xx, pp. 25–34.

ROY, S. K., and BOSE, S. C. 1922.—Filariasis in Puri. Ind. Med. Gaz. lvii, pp. 281–286.

SÉGUY, E. 1924.—Les Moustiques de l'Afrique Mineure, de l'Egypte et de la Syrie. Pp. 1–257. Encycl. Ent., Paris.

—— 1925 *a*.—Faune de France.—12. Dipt., Culicidæ. Pp. 43–82. Paris.

—— 1925 *b*.—Notes sur les Moustiques de l'Afrique Mineure, de l'Egypte et de la Syrie.—1. Encycl. Ent., Diptera, i, pp. 13–21.

—— 1925 *c*.—Notes sur les Moustiques.—I & II. *Ibid.* pp. 120, 157–158.

SENIOR-WHITE, R. 1919–1927. *See* WHITE, R. SENIOR.

STRICKLAND, C. 1917.—A curious Adaptation of Habit to its Environment of a Malayan Mosquito. Journ. Straits Branch Roy. Asiatic Soc. no. 75.

THEOBALD, F. V. 1901 *a*.—A Monograph of the Culicidæ of the World—1. British Museum.

—— 1901 *b*.—A Monograph of the Culicidæ of the World.—2. British Museum.

—— 1903 *a*.—A Monograph of the Culicidæ of the World.—3. British Museum.

—— 1903 *b*.—New Culicidæ from the Federated Malay States. Entomologist, xxxvi, pp. 256–259.

—— 1904 *a*.—A new Culicid Genus from Uganda. Journ. Trop. Med. vii, pp. 17–18.

—— 1904 *b*.—The Mosquitoes of Egypt, the Sudan, and Abyssinia. First Rept. Well. Trop. Res. Lab. pp. 62–83. Dept. Educ. Sudan Govt., Khartoum.

—— 1904 *c*.—New Culicidæ from the Federated Malay States. Entomologist, xxxvii, pp. 77–78.

—— 1904 *d*.—New Culicidæ from the Federated Malay States. *Ibid.* xxxvii, pp. 163–165.

—— 1904 *e*.—New Culicidæ from the Federated Malay States. *Ibid.* xxxvii, pp. 236–239.

—— 1905 *a*.—A Catalogue of the Culicidæ in the Hungarian National Museum, with Descriptions of new Genera and Species. Ann. Mus. Nat. Hung. iii, pp. 61–120.

—— 1905 *b*.—A new Genus of Culicidæ. Entomologist, xxxviii, pp. 52–56.

—— 1905 *c*.—Genera Insectorum. Fasc. xxvi.—Family Culicidæ.

—— 1905 *d*.—New Culicidæ from India, Africa, British Guiana, and Australia. Journ. Econ. Biol. i, pp. 17–36.

—— 1905 *e*.—Some new Mosquitoes from Ceylon. Journ. Bomb. Nat. Hist. Soc. xvi, pp. 237–250.

—— 1906.—Second Report Wellcome Tropical Research Laboratories. Report on Economic Entomology, pp. 67–83. Dept. Educ. Sudan Govt., Khartoum.

—— 1907.—A Monograph of the Culicidæ of the World.—4. British Museum.

THEOBALD, F. V. 1908.—First Report on the Collection of Culicidæ and Corethridæ in the Indian Museum, Calcutta, with Descriptions of new Genera and Species. Rec. Ind. Mus. ii, pp. 287–302.

—— 1909.—Descriptions of new Mosquitoes collected by Dr. Graham in Ashanti. Col. Off. Rept. Miscell. no. 237. [Unpublished.]

—— 1910 *a*.—The Culicidæ of Fiji, including two new Species. Entomologist, xliii, pp. 155–159.

—— 1910 *b*.—A Monograph of the Culicidæ of the World.—5. British Museum.

—— 1910 *c*.—Second Report on the Collection of Culicidæ in the Indian Museum, Calcutta, with Descriptions of new Genera and Species. Rec. Ind. Mus. iv, pp. 1–33.

—— 1911.—Culicidæ of the R. Zool. Soc. "Natura Artis Magistra," Amsterdam, and Descriptions of three new Species. Tijd. v. Ent. liv, pp. 233–240.

THEODOR, O. 1924.—Pupæ of some Palestine Culicines. Bull. Ent. Res. xiv, pp. 341–345.

VOGEL, R. 1929.—*Aëdes pulchritarsis* ein Baumhohlenbruter. Int. Rev. Hydrobiol. xxi, pp. 161–170.

WATERSTON, J. 1918.—On the Mosquitoes of Macedonia. Bull. Ent. Res. ix, pp. 1–12.

WESCHÉ, W. 1910.—On the Larval and Pupal Stages of West African Culicidæ. Bull. Ent. Res. i, pp. 7–50.

WESENBERG-LUND, C. 1921.—Contributions to the Biology of the Danish Culicidæ. Mém. Acad. R. Sci. & Lettres, Copenhagen, Sec. Sci. 8th Series, vii. no. 1, pp. 1–210.

WHITE, R. SENIOR. 1919.—*Toxorhynchites minimus.* Spol. Zeyl. xi, pp. 189–191.

—— 1920.—A Survey of the Culicidæ of a Rubber Estate. Ind. Journ. Med. Res. viii, pp. 304–325.

—— 1922.—Notes on Indian Diptera. Mem. Dept. Agric. India, Ent. Series, vii, pp. 83–169.

—— 1923.—Catalogue of Indian Insects.—Part 2. Culicidæ. Pp. 1–124. Calcutta.

—— 1925.—Notes on Ceylon Mosquitoes.—I. Spol. Zeyl. xiii, pp. 213–222.

—— 1927.—Notes on Ceylon Mosquitoes.—II. The Larvæ of the commoner non-Anopheline Mosquitoes. Spol. Zeyl. xiv, pp. 61–76.

WIGGLESWORTH, V. B. 1929.—The early Stages of some West African Mosquitoes. Bull. Ent. Res. xx, pp. 59–68.

YAMADA, S. 1921.—Descriptions of Ten new Species of *Aëdes* found in Japan, with Notes on the Relation between some of these Mosquitoes and the Larva of *Filaria bancrofti.* Ann. Zool. Jap. x, Article 6, pp. 45–81.

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ABBREVIATIONS USED IN TEXT.

Adult †.

apn	Anterior pronotal lobe (prothoracic lobe).
ppn	Posterior pronotal lobe (proepimeron).
af.......	Anterior or upper forked cell of wing.
pf	Posterior or lower forked cell of wing.

Larva.

isc	Inner (submedian dorsal) caudal hair of anal segment.
osc	Outer (submedian dorsal) caudal hair of anal segment.
lh	Lateral hair on saddle of anal segment.
I–VIII ..	Abdominal segments.

Distribution.

An asterisk (*) denotes specimens examined by Author.

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† For explanation of lettering on figures of ♂ hypopygia see p. 4; for numbering of wing-veins see pp. 3, 57.

ERRATA.

Page 19. Line 8 from bottom, *for* hair 8 *read* hair 7.
„ 43. „ 2 of first footnote, *for* serrate *read* straight.
„ 120. „ 9 from bottom, for *pygmeus* read *pygmæus*.
„ 183. Paragraph on distribution, *for* Wuch'ang, HUPEH, *read* Kiukiang, KIANGSI.
„ 340. Line 14, *for* p. 348 *read* p. 343.

Order DIPTERA.

Family CULICIDÆ.

Tribes MEGARHININI and CULICINI.

INTRODUCTION.

I. The Indian Area.

The area, as here dealt with, is shown on the map at the end of this volume. It extends from the western boundaries of Kashmir, the North-West Frontier Province, and Baluchistan, along the chain of the Himalayas, to the eastern boundaries of Assam and Burma. From the northern boundary of the Himalayas it extends southwards to include the Indian Peninsula and Ceylon; also the Andaman, Nicobar, Laccadive, and Maldive groups of islands.

Within the area many varying conditions of climate prevail —from desert conditions in Sind to areas of very heavy precipitation in the north-east and south, where the annual rainfall may be as heavy as 500 inches per annum.

II. Distribution.

Mosquitoes are common over practically the whole area, and in many parts occur in enormous numbers. They have been collected at altitudes of 14,000 feet or more in Kashmir, and *Culex fatigans* has been found at 3,760 feet below ground-level (903 feet below sea-level) in the Kolar Gold Mines in South India.

The distribution of genera and species within the area, and beyond its limits, is given in the systematic part of this work.

The mosquito fauna is mainly western Oriental in character, but there is an admixture of Palæarctic and Ethiopian species in the north and west, and of Malayan or eastern Oriental forms in the southern, eastern, and north-eastern regions.

of heavy rainfall. Several species have a world-wide distribution through the tropical and subtropical zones, such as *Aëdes ægypti* and *Culex fatigans*, these two being mainly domestic. *Aëdes vexans* is found in the Nearctic, Palæarctic, and Oriental regions, and ranges as far eastwards as some of the Pacific islands. Some species, on the other hand, appear to be very local, such as those of *Aëdes* (*Finlaya*), which are known only from the Western Himalayas (possibly representing a Central Asian element in the fauna), and those of *Aëdes* (*Aëdes*), known only from Northern Bengal or Assam.

For more general considerations regarding faunal areas, and conditions governing the distribution of mosquitoes, reference should be made to the companion volume on the Anophelini by Colonel Sir Rickard Christophers.

III. CLASSIFICATION.

The arrangement of tribes, genera, and subgenera is in accordance with that adopted by Edwards (1932), the older classifications of Theobald and others having been considerably modified as a result of very intensive study of the subfamily by numerous workers during the past thirty years. It seems unlikely that any considerable alterations will be found necessary in the future.

IV. CHARACTERS USED IN IDENTIFICATION AND CLASSIFICATION.

The nomenclature used for the various parts is, so far as possible, in accordance with that adopted in the companion volume on the Anophelini, and for explanation of most of the terms used reference should be made to the Introduction to that volume.

ADULT.—Points of value in identification are as follows:—

Head: character and coloration of scaling, and arrangement of bristles; form of bucco-pharyngeal armature of ♀ (present only in genus *Culex* and its various subgenera). *Antenna*: coloration of torus, and presence or absence of scales—the form of this part is also of importance in *Culex* (*Lophoceratomyia*); length of antenna compared with that of proboscis; form of flagellar segments (*e.g.*, in *Aëdomyia*, *Heizmannia*, etc.), and character of hair-whorls—scale-tufts often present in ♂♂ of *Culex* (*Lophoceratomyia*). *Clypeus*: shape (as distinguishing the Megarhinini from Culicini, and genus *Harpagomyia* from others); presence or absence of scales. *Palpi* and *proboscis*: length, shape, ornamentation.

Thorax: shape—somewhat produced over the head in some species of *Armigeres* (*Leicesteria*); scaling, ornamentation, and chætotaxy of mesonotum and scutellum ; size of pronotal (prothoracic) lobes—usually enlarged in *Hæmagogus* and *Heizmannia* ; character of scaling, if any, on posterior pronotum; arrangement of bristles on pleuræ (this is of great importance, and is shown in fig. 7, p. 29. The important groups of thoracic bristles are :—

(a) *Anterior pronotal,* on pronotal (prothoracic) lobes.

(b) *Posterior pronotal* (pro-epimeral), on the part of the side of thorax above pronotal lobe and in front of anterior spiracle.

(c) *Propleural* (prosternal), on the part above front coxa and below anterior pronotal (prothoracic) lobe.

(d) *Spiracular,* a row immediately in front of anterior spiracle, separated from posterior pronotal by a slight ridge forming posterior border of posterior pronotum.

(e) *Postspiracular,* on membranous part of pleuræ behind anterior spiracle (especially characteristic of the *Aëdes* group).

(f) *Sternopleural,* a more or less continuous row on posterior border of sternopleura.

(g) *Prealar,* on a small knob immediately below and in front of wing-root.

(h) *Upper mesepimeral* (subalar), immediately below and behind wing-root, on upper part of mesepimeron, and in front of posterior spiracle.

(k) *Lower mesepimeral,* on middle or lower part of mesepimeron.

(l) *Postnotal,* a tuft of fine hairs on postnotum.

Note position of meron (a triangular plate below mesepimeron) in relation to hind coxa.

Wings: venation or arrangement of veins. The notation of veins, as used in this volume, is shown in fig. 15, p. 57. The veins and branches are referred to by numbers, *e. g.*, 2, 2.1, 2.2 indicate respectively the 2nd longitudinal vein (R_{2+3}*), the anterior branch (R_2), and the posterior branch (R_3) of this vein. Cross-veins are referred to by numbers also, *e. g.*, that joining the 3rd (R_{4+5}) and 4th (M) longitudinal veins is called c.-v. 3–4 (*r-m*), indicating that it lies between veins 3 and 4. Note especially length of vein 6 and position of its termination in relation to bifurcation of vein 5 ; length of anterior forked-cell ; size of microtrichia (small hairs on wing-membrane, minute in *Uranotænia*) ; coloration and shape of scales on veins; length of wing from base of costa to tip (as indicating size of a particular species); presence or absence of hairs on squama (see fig. 7, **g**, p. 29), and of hairs on upper and underside of wing at base (latter present only in *Theobaldia*).

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* As in the Comstock-Needham system of notation, used by some authors.

Legs: ornamentation, especially presence or absence of pale rings or bands on tarsal segments, if present, whether basal or apical, or both; comparative length of tibia and of tarsal segments; presence or absence of outstanding scales; tarsal claws, whether toothed or simple (fig. 7, **d–f**); presence or absence of pulvilli (developed only in *Culex* and its subgenera). (Under a binocular microscope the pulvilli appear pale against a dark background.)

Abdomen: ornamentation of dorsum and venter and character of scaling (tufts on terminal segments in some species of *Megarhinus*, or on venter in some species of *Aëdes* (*Finlaya*)).

Hypopygium: structure of terminalia of ♂♂ of importance in all genera; nomenclature of parts shown in figs. 6, 35, 48, 49, 81, etc. Explanation of lettering of parts:—

9T, 9S,	ninth tergite and sternite.
C,	coxite (side-piece).
S,	style (clasper).
BL,	basal lobe or process of coxite.
SL, or SA,	subapical lobe of coxite.
EXA,	external apodeme of coxite.
BA,	basal apodeme of phallosome and coxite.
H,	harpago (basal appendage of coxite in *Aëdes*).
HF,	harpaginal fold, connecting the two harpagines.
EHF,	eminence on harpaginal fold (rudimentary harpago).
PG,	proctiger or anal segment.
PT, or VLP,	paraproct (lateral or ventro-lateral chitinisation of anal segment).
CR,	crown of paraproct.
DP,	dorsal plate of proctiger (tenth tergite).
LA,	basal lateral arm of paraproct (in *Culex*).
PH,	phallosome (mesosome or ædeagus).
LP,	lateral plate of phallosome (when chitinisations are paired).
BP, EXP, MP, and VC,	basal, external, and median processes and ventral cornu of lateral plate of phallosome (in *Culex*).
PM,	parameral plate.

Terminalia of ♀♀ of special importance in *Aëdes* (*Aëdes*) and *Mansonia* (*Mansonioides*); nomenclature of parts shown in figs. 30, 70, 72.

PUPA.—General structure shown in fig. 8 of the volume on Anophelini.

Points of value in identification are:—

Form of respiratory trumpet; arrangement of hairs on abdominal segments; shape of paddles.

The pupæ of the Culicini, with the exception of one or two genera, have not been closely studied, but, where material has been available, brief descriptions have been given.

LARVA.—Points of value in identification :—

Character and arrangement of *frontal hairs*. The author has followed the notation proposed by Edwards and Given (1928, p. 338) for the five important pairs of hairs on the fronto-clypeus of the larvæ of the Culicini, and these are referred to respectively as *A*, *B*, *C*, *d*, and *e*; the first three are usually larger and more conspicuous than the first two, and are homologous with the three pairs of frontal hairs of Anophelini, hair *d* being homologous with the posterior clypeal and *e* with the occipital. The position of these varies greatly in different genera, as will be seen by referring to figs. 31, **b**, 34, **d**, 42, etc. Characters of mouth-brush hairs, preclypeal spines, and of mentum. *Antennæ*: length and thickness of shaft; position and character of shaft-hair or tuft, and of subapical bristles; presence or absence of spines or spicules on shaft. Chætotaxy of *thorax* (see figs. 3, 9, 39, 102) and abdomen. Form of *comb* and structure of teeth of comb on abdominal segment VIII. Length of *siphon-tube* compared with diameter at base. Presence or absence of an *acus* (small extension of chitin) at base of siphon-tube on each side (usually present in subgenus *Finlaya* and in genus *Culex*). Presence or absence of *pecten* on siphon, and, if present, number and form of teeth. Number and arrangement of hairs on siphon, and any modification of valves at tip of siphon. Extent of chitinisation of *anal segment*; characters of subdorsal (outer and inner submedian caudal), lateral, and fan-hairs; length and form of anal papillæ.

EGG.—This stage of Megarhinini and Culicini has been very little studied at present, but references to available descriptions have been given in the systematic part. Eggs may be laid singly or cemented together in rafts: they differ from those of Anophelini in the absence of lateral floats.

V. BIONOMICS AND RELATION TO DISEASE.

Information on bionomics is given in the systematic part of this work, under tribes, genera, and species.

The only human diseases prevalent in India which are known to be transmitted by mosquitoes are malaria, dengue, and filariasis. The Megarhinini, being non-blood-sucking forms, are not concerned in the transmission of disease, and no species of the Culicini are known to transmit malaria. Very little work on dengue, in connection with mosquitoes, has been done in India, but *Aëdes ægypti* and *Aëdes albopictus* have been shown to be carriers in other parts of the world, and these two, which are both very common, and possibly other allied species, most probably transmit the disease in India. *Culex fatigans*, one of the commonest domestic mosquitoes in most parts of the country, appears to be the chief carrier of filariasis. Other Indian species which may be concerned in the transmission of this disease are *Mansonia longipalpis*, *Aëdes ægypti*, *Aëdes scutellaris*, *Culex vishnui*, and certain species of *Anopheles*.

Yellow fever has not, up to now, occurred in India, but the Indian race of *Aëdes ægypti* has been shown to be capable of transmitting this disease. Other common Indian species have also been shown to be potential carriers, e. g., *Aëdes albopictus* and *Aëdes vittatus*.

It is not possible to quote all references to this subject. Abstracts of papers will be found in the 'Tropical Diseases Bulletin,' and in the 'Review of Applied Entomology.' The following may be cited as referring to India :—James, 1900 ; Cruikshank & Wright, 1914 ; Roy & Bose, 1922 ; Megaw, 1923 ; Megaw & Gupta, 1927 ; Barraud, 1928 *c* ; Korke, 1928 *a*, 1928 *b*, 1929, 1930 *a*, 1930 *b*, 1930 *c*, 1932 ; Hindle, 1929 ; Rao & Iyengar, 1930, 1932 ; Acton & Rao, 1931 ; Kumm, 1931 *b*. (For full references, see Bibliography at end of this volume).

VI. SYNONYMY AND REFERENCES.

The synonymy given in the systematic part is that which seems to be agreed upon at the present time. For considerations of space only Oriental synonyms are included. Full synonymy will be found in Edwards (1932). It is most probable that some alterations will be found necessary in the future, when the life-histories of more species have been worked out. Some of the forms at present treated as varieties will perhaps be allotted specific rank, and *vice versa*.

References to original descriptions have been given in all cases. Endeavour has been made to include also all the more important recent systematic references, but it has been thought unnecessary to repeat the names of older works, as the descriptions are now, for the most part, of little value, or merely copies of the originals to which references have been given.

SYSTEMATIC.

Characters distinguishing the Tribes Megarhinini *and* Culicini.

ADULTS.

Proboscis rigid, apical ½ more slender and bent downwards, or hooked (fig. 1); posterior margin of scutellum evenly rounded; clypeus broader than long, with front margin slightly trilobed; a V-shaped thickening in hind margin of wing between branches of vein 5 . . . . MEGARHININI, [p. 8.

Proboscis more flexible, usually of uniform thickness, but sometimes swollen at tip (figs. 10, 12), not hooked; posterior margin of scutellum more or less trilobed, and with three distinct groups of bristles; clypeus longer than broad, rounded above and in front; no V-shaped thickening in hind margin of wing . . . . CULICINI, [p. 28.

PUPÆ.

Outer part of paddle produced beyond termination of midrib, hind border not serrated and without terminal hair, but finely fringed (fig. 5); respiratory horn not ending in a chitinised spine, nor divided nearly to the base into leaflets . . . . MEGARHININI.

Outer part of paddle not usually produced beyond termination of midrib (fig. 24, etc.), but should it have this appearance the hind margin is either serrated, or with terminal hair (fig. 22), or respiratory horn ends in a chitinised spine (fig. 31), or is divided nearly to the base into leaflets (fig. 14, a) . . . . CULICINI.

LARVÆ.

Mouth-brushes each composed of 10 stout lamellæ, or flattened bristles, placed in a regular row; abdominal segment VIII without comb, but with lateral chitinised plate on each side carrying two plumose bristles . . . . MEGARHININI.

Mouth-brushes composed of numerous hairs; if these are modified into lamellæ there are about 30 or more in each brush, not arranged in a regular row; abdominal segment VIII with comb, and with or without lateral chitinised plates . . . . CULICINI.

Tribe MEGARHININI.

According to the most recent classification, this tribe includes only one genus, *Megarhinus*, which has been divided into three groups by Edwards (1932). Two of these groups are purely American, the third being confined to the Old World. The description given below applies to this last group, which corresponds to Theobald's genus *Toxorhynchites*.

[In this description the characters of adult and larva which specially distinguish *Megarhinus* from mosquitoes of the tribe Culicini are printed in italics.]

Genus **MEGARHINUS** Robineau-Desvoidy, 1827.

Mem. Soc. d'Hist. Nat. iii, p. 403. Genotype, *Culex hæmorrhoidalis* Fab.

Toxorhynchites Theobald, 1901, M.C. i, p. 244. Genotype, *T. brevipalpis* Theo.

Worcesteria Banks, 1906, Phil. J. Sci. i, p. 779. Genotype, *W. grata* Banks.

Teromyia Leicester, 1908, Cul. Malaya, p. 49. Genotype, *T. acaudata* Leic.

ADULT*.—Large or very large mosquitoes, usually with metallic blue, yellow, purple, or white flat scales ; lateral tufts of coloured hairs on terminal abdominal segments in some species ; *clypeus broader than long, with front margin slightly trilobed* ; *proboscis curved downwards and backwards in the middle, basal ½ rigid* and usually thick, apical ½ more slender, tapering to apex, and flexible, proboscis not adapted for piercing or sucking blood ; bucco-pharyngeal armature absent ; palpi of ♂ about length of proboscis, and composed of 5 segments, segment 1 very small, 5 long and tapering to tip, 4 and 5 upturned, all segments covered with flat scales, some short spines on terminal segments, but no hair-tufts ; palpi of ♀ of varying length in different species, and from about ⅙–¼ length of proboscis, composed of 3 segments, of which the terminal one is very small and hidden by scales ; antennæ of ♂ plumose, those of ♀ setose ; *scutellum not lobed, posterior margin slightly and evenly rounded* ; *anterior fork-cell of wing very short* ; *a V-shaped thickening in wing-membrane between branches of vein 5* ; squamal fringe absent ;

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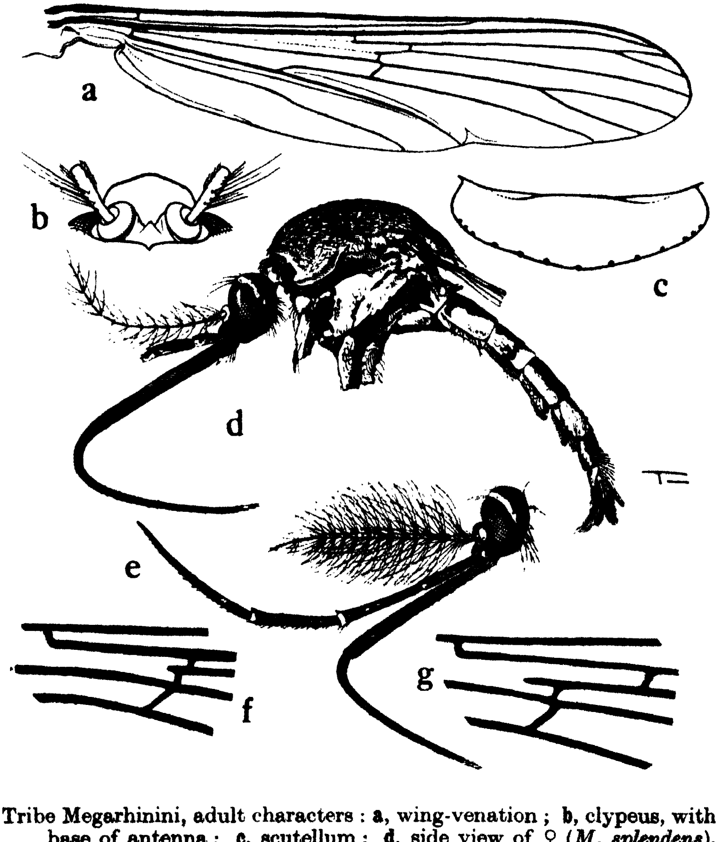
* Edwards 1921 *c*, p. 284 ; 1932, p. 58 ; Howard, Dyar, & Knab, 1917, p. 928 ; Barraud 1929 *b*, p. 271 ; Barraud & Covell 1928, p. 676 (buccal cavity) ; Martini 1929, p. 114.

thoracic bristles reduced, no posterior pronotal or post-spiracular, none on mesonotum except laterally, only two pairs of orbital, but a row of strong spiracular bristles present; fore and mid-tarsal claws of ♂ unequal, the larger with one tooth, those on hind legs, and on all legs of ♀, simple.

Fig. 1.



Tribe Megarhinini, adult characters: **a**, wing-venation; **b**, clypeus, with base of antenna; **c**, scutellum; **d**, side view of ♀ (*M. splendens*), wings and legs omitted; **e**, head of ♂; **f**, central portion of wing, *M. kempi*; **g**, ditto, *M. splendens*.

Hypopygium of ♂ * of simple structure and very similar in all Indian species. 9th sternite broadly crescentic and not specialized; coxite with a terminal style and with a hairy

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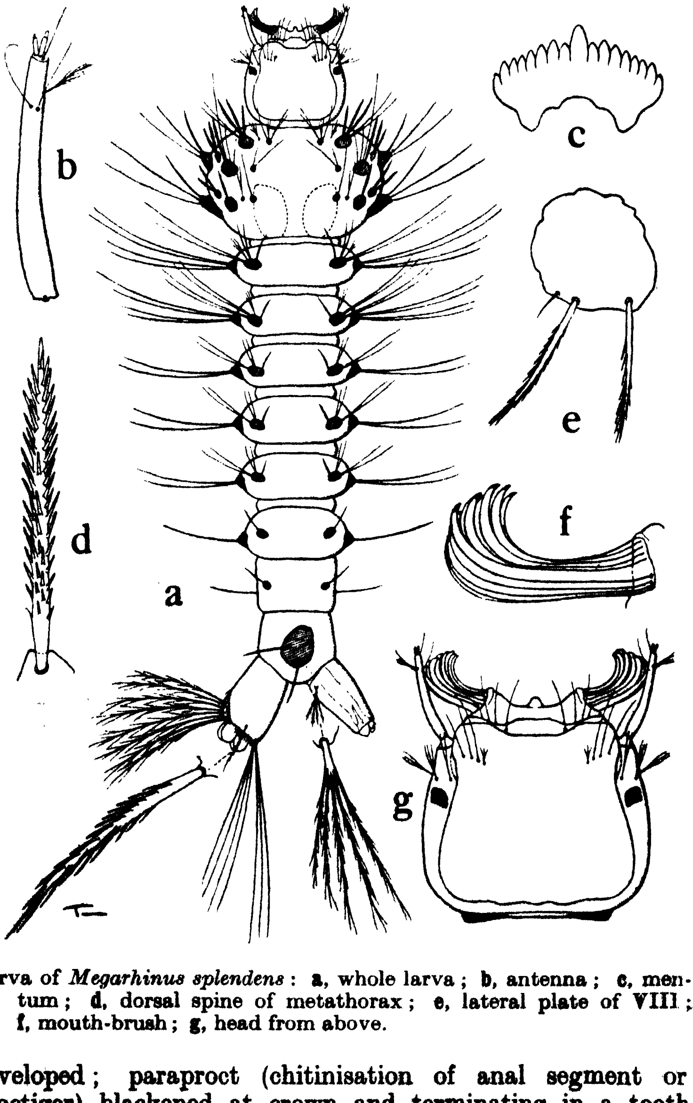
* Edwards 1920 *b*, pp. 23–40; Christophers 1922, pp. 530–571; 1923, pp. 698–720; Macfie & Ingram 1922, p. 164; Barraud 1929 *b*, p. 271.

basal lobe on anal surface connected with that of the other side by the harpaginal fold ; lateral plates of phallosome long and narrow ; parameral plate and basal apodeme moderately developed ; paraproct (chitinisation of anal segment or proctiger) blackened at crown and terminating in a tooth with a few minute hairs immediately below. Hypopygium of ♀ of simple type also ; cerci comparatively broad and

Fig. 2.



Larva of *Megarhinus splendens* : **a**, whole larva ; **b**, antenna ; **c**, mentum ; **d**, dorsal spine of metathorax ; **e**, lateral plate of VIII ; **f**, mouth-brush ; **g**, head from above.

short, postgenital plate lobe-like and not usually emarginate at apex, insula with a number of hairs arranged in a median group, three chitinised spermathecæ present.

PUPA.—Respiratory horn about 2½–3 times as long as the greatest width in side view, expanded towards tip, opening oval and oblique; in antero-posterior view the basal part is rather swollen, with a slight constriction at base of opening. Dendritic tufts on abdominal segment I well developed. The five submedian and sublateral hairs on tergites II–VII form a group towards the lateral margin, innermost always small and simple, other four varying according to the species; dorsal and lateral hairs on tergite VIII both small and usually simple. Paddles large and of characteristic shape in each species; a dark irregular mark across bases of paddles except in one species; midrib strong; no terminal hair or spine; posterior margin fringed with delicate hairs; outer part produced beyond termination of midrib (this is not the case in the Culicini, except in two or three genera, and in these the respiratory horn terminates in a strong spine, or is divided nearly to the base into leaflets).

LARVA *.—Very uniform in structure throughout the genus; usually of a deep red or reddish-brown colour, those of the larger species measuring up to 16 mm. in length. Head subquadrangular, hairs on dorsal surface all placed very far forward, *fronto-clypeus divided by a suture into an anterior part and a much larger posterior part*; *the anterior carries four hairs on each side, three fine and simple and one very minute and spine-like* (*the outermost*), *the posterior part also carries four hairs on each side, three fine and simple and one very small and branched* (*the innermost*) †. Antenna short, shaft smooth, *hair-tuft represented by two fine hairs* situated some little distance below the tip; between these and the tip there is a small branched subapical hair. Mouth-parts adapted for predaceous purposes, *hairs of mouth-brushes modified into ten strong lamellæ with hooked tips. Thorax with some heavily chitinised plates carrying thick spinulose bristles* (arrangement shown in diagrammatic form in fig. 3). Prothorax with two large plates on each side, a dorso-lateral and ventro-lateral; the former carries hairs 5–7 (5 and 7 being bristles), *the latter carries hair* 8, always small and branched, and the four pleural hairs (9–12) on a raised tubercle, one of these being a bristle. Mesothorax bearing three or four plates on each side; dorso-

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* Barraud 1931 *a*, p. 1127; Green 1905, p. 160; Senior-White 1927, p. 66; Edwards 1932, p. 58.

† [The four posterior hairs seem to correspond with hairs *A*, *B*, *C*, and *d* of Culicini, hair *e* being absent. The four anterior hairs presumably represent the preclypeals and anterior clypeals of Anophelini.]

lateral plate bearing hairs 2–6 (5 being a bristle), plate sometimes divided, hairs 2 and 3 being on a separate small plate ; hair 7 lateral, bristle-like, arising from a tubercular plate ; the ventro-lateral plate carries the pleural hairs 9–12 *and hair* 8, as on the prothorax. Metathorax with thirteen hairs as against fourteen on the pro- and mesothorax, hairs 1*a* and 14 both missing ; hairs 5, 7, and 13 are bristles arising from separate plates, the last being ventral ; pleural hairs and hair 8 on a ventro-lateral plate, as on the other two segments. In addition to the large plates mentioned, there are some much smaller plates, from which the finer hairs arise *. On abdominal segments I–VII there are three plates on each side, a dorso-lateral, lateral, and ventro-lateral, which carry either spinulose bristles or long plumose hairs, or both ; these are very similar in all species except the dorso-lateral plate on VII, on which there may be two bristles and three hairs, or one bristle and four hairs. *Segment VIII with a large lateral plate on each side in place of a comb, with two strong bristles* and some small hairs. Siphon-tube short and wide, a single pair of strong branched hair-tufts arising near base, pecten absent. Anal segment enclosed in a strongly chitinised ring, with numerous spines along the posterior margin, both long and short irregularly alternating, lateral hair bristle-like, spinulose, both pairs of subdorsal hairs divided into a number of long branches, anal papillæ quite short, anal fan well developed, the hairs split into fine branches.

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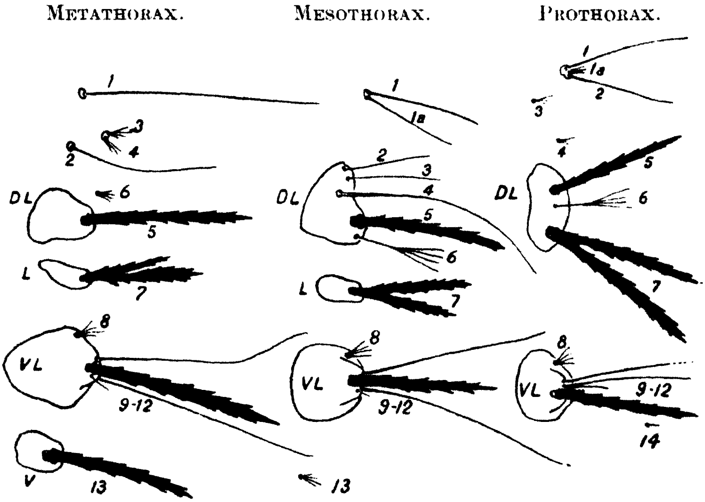
* Dr. F. W. Edwards has suggested altering the numbers of the hairs on the thorax from those given by me in 1931 in order to harmonize these with the notation used by Puri and Christophers for Anophelini (adopted here also for Culicini, figs. 9, 39, and 102). He has also pointed out that hair no. 8 (previously numbered 13 by me) is on the dorsal side of the plate carrying the pleural hairs (9–12), as in fig. 3—not on the ventral side, as shown in my previous drawing. Dr. Puri has very kindly re-examined material with me at Kasauli. We have found some difficulty in deciding on the probable correct numbering, for, as pointed out by Edwards, the thoracic chætotaxy of Megarhinini seems to differ more from Anophelini and Culicini than these do from one another. The numbers in fig. 3 are those which appear now to be the most satisfactory, and are in accord with those proposed by Edwards, except that we designate the median prothoracic hairs 1, 1*a*, 2, and 3 instead of 1, 2, 3, and 0, respectively, as we think that hair 0 (of Anophelini) is almost certainly absent in Megarhinini ; the ventral prothoracic hair we designate 14 instead of 13. It appears to us that in Megarhinini hair 13 is absent from the prothorax and hair 14 from the mesothorax ; another peculiarity is the association of hairs 8–12 on the same plate on each segment of the thorax (though 8 is separate on the prothorax in some species, e. g., *M. albipes*).

BIONOMICS *.—The adults fly by day and visit flowers for the purpose of sucking honey. The majority of the species are found only in forest or jungle. The ♂♂ are said to congregate on leaves of bushes, forming a stationary swarm.

In India the larvæ are most frequently found in water in tree-holes or bamboos, where they prey upon and devour the larvæ of other mosquitoes living in the same situations. The larva of *M. splendens* (Wied.) is sometimes found in domestic collections of water, such as water-butts or earthenware jars in the vicinity of human dwellings, particularly on the outskirts of towns, and cities such as Calcutta. It is unusual to find more than one fully-grown larva in a bamboo or tree-hole, but sometimes in a water-butt, large earthenware jar, or hollow tree containing a quantity of water several larvæ may be found living together. In such situations

Fig. 3.


METATHORAX. MESOTHORAX. PROTHORAX.

Megarhinus splendens Wied.: chætotaxy of right side of thorax of larva. For numbering of hairs see footnote on opposite page. Hairs nos. 9–12 are pleural hairs; hair no. 13 of prothorax and no. 14 of mesothorax are apparently absent. Chitinous plates: *DL*, dorso-lateral; *L*, lateral; *VL*, ventro-lateral; and *V*, ventral. Mid-dorsal line at top of block, mid-ventral line at bottom.

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* Green 1905, p. 161; Paiva 1910, p. 187; Howard, Dyar, & Knab 1912, pp. 109, 113, 118, 131; Senior-White 1920, p. 319; Edwards 1932, p. 58; Brug 1932, p. 73.

the larvæ do not appear to attack one another so long as larvæ of other species be present, but in the absence of the latter they may do so, and may even seize and suck dry pupæ of their own species.

The larva rests quietly at the surface of the water, sometimes almost horizontally, at other times in a more vertical position, and captures other larvæ with the mouth-brushes, when they approach within reach, by a rapid sideways jerk of the head and thorax.

The eggs are roundish and slightly oval; they are dropped singly on water while the insect is in flight, and float buoyantly by means of air-bubbles which form amongst tubercles or spines present on the egg-shell.

DISTRIBUTION.—Tropics of both the Old and New Worlds, a few species being found also in the north temperate zone. About 50 species have been described, of which about 20 are American. Six have, so far, been found in India, two being peculiar to that area, the other four having a distribution further east. Several of the Indian species occur in the Himalayas, two being found at elevations of 7,000 feet or more.

Key to Adults.

1.	Tarsi entirely dark (♂♀); small and slender species, wing-length less than 5 mm.	*minimus*, p. 22.
	Some tarsal segments with white markings; large species, wing-length usually 6 mm. or more.	2.
2.	All three terminal tarsal segments of all legs with white markings or entirely white............	*albipes*, p. 16.
	One or more of the three terminal tarsal segments on fore or hind legs without white markings...	3.
3.	Mesonotum with conspicuous border of pale yellow scales continuous from front, along sides, over wing-roots, to scutellum	*edwardsi*, p. 23.
	Mesonotum without a continuous pale border...	4.
4.	Abdomen with conspicuous lateral tufts of hairs on VI–VIII, those on VII black, on VIII orange; scales on mesonotum dull bronzy- or greenish-brown except laterally.....................	*splendens*, p. 24.
	Abdomen without conspicuous lateral tufts of hairs, scales on mesonotum brilliant metallic green..................................	5.
5.	Dorsum of abdomen mainly coppery purple, with narrow blue basal bands; segments 2 and 3 of mid-tarsi of ♀ mainly purple, 5th segment of hind tarsi white, segment 1 of hind tarsi of ♂ with dense bristles beneath	*kempi*, p. 18.
	Dorsum of abdomen mainly deep blue or deep purple, with lateral pale yellow markings; segments 2 and 3 of mid-tarsi of ♀ white, segment 5 of hind tarsi dark, segment 1 of hind tarsi of ♂ without dense bristles beneath .	*gravelyi*, p. 20.

Key to Pupæ.

1. Paddle elongate, 1½ times to twice as long as greatest width, all 5 inner hairs* near the posterior margin of tergite VII fine and short, hardly projecting beyond posterior border of that segment .... 2.

   Paddle wide and rounded, less than 1½ times as long as greatest width, one of the 5 inner posterior hairs of tergite VII very long and stout, reaching beyond posterior margin of VIII. 5.

2. Apical margin of paddle not emarginate nor produced into a point .... *gravelyi.*

   Apical margin of paddle emarginate or produced into a blunt point.......................... 3.

3. One of the 5 inner posterior hairs of tergite V long and stout, the four others slender and comparatively short .... 4.

   Two of the 5 inner posterior hairs of tergite V long and stout, the three others quite small .... *albipes.*

4. One of the 5 inner posterior hairs of tergite IV long, the four others quite small, paddle 1½ times as long as greatest width; apical margin emarginate and rounded, an irregular dark line across base .... *minimus.*

   Two of the 5 inner posterior hairs of tergite IV long and stout, the three others quite small, paddle twice as long as greatest width, apex produced into a blunt point, no irregular dark line across base .... *kempi.*

5. Larger hair on VII long and stout, usually much longer than tergite VIII, often as long as greatest width of paddle .... *splendens.*

   Larger lateral hair on VII short and fine, not as long as tergite VIII .... *edwardsi.*

Key to Larvæ (4th stage).

1. Mesothoracic dorso-lateral plate undivided ..... 2.

   This plate divided .... 4.

2. Dorso-lateral plate of VII carrying 2 bristles and 3 hairs .... *splendens.*

   This plate carrying 1 bristle and 4 hairs .... 3.

3. Bristle 5 on prothoracic dorso-lateral plate only about ½ the length of bristle 7, both usually single (5 occasionally bifid); mesothoracic dorso-lateral plate with a projection carrying hairs 2 and 3, hair 6 on this plate with 3 to 5 branches; chitinisations of head and body light brown or yellow .... *kempi.*

   Bristles 5 and 7 on prothoracic dorso-lateral plate about the same length, 5 single, 7 bifid; mesothoracic dorso-lateral plate without a marked projection, hair 6 on this plate nearly always simple, chitinisations of head and body deep brown .... *edwardsi.*

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* The expression "inner hairs" is used to include the five submedian and sublateral hairs as distinct from the lateral.

4. Siphon distinctly shorter and smaller than chitinised part of anal segment, longer bristle on lateral plate of VIII more than ⅓ length of siphon (not including valves), chitinisations of head and body deep brown . . . . *albipes.*
   Siphon as long as, or longer than, chitinised part of anal segment, longer bristle on lateral plate of VIII less than ½ length of siphon, chitinisations of head and body light brown or yellow . . 5.
5. Small; siphon about length of chitinised part of anal segment, or slightly longer, hair 6 on mesothoracic dorso-lateral plate usually simple . . . . . *minimus.*
   Large; siphon longer than chitinised part of anal segment, hair 6 on mesothoracic dorso-lateral plate with 3 or 4 branches . . . . *gravelyi.*

1. **Megarhinus albipes** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 287 (♂ & ♀). TYPE-LOC.: Simla (Jakko), W. Himalayas, 7,000 to 8,000′, viii. 1915 (*Christophers*). TYPE: ♂ and allotype ♀ in Brit. Mus.

ADULT*.—A fairly large species without conspicuous lateral tufts on terminal segments of abdomen. Leg-markings distinctive, all tarsi marked with white to a greater or less extent†. Wing 8–9·5 mm.

♀.—*Head-scales* dull dark purple dorsally, white laterally, usually a narrow white border to eye-margins; *proboscis* purple on stout basal part, bluish or greenish apically; *palpi* purple, reaching to base of 5th flagellar segment of antenna. *Mesonotal* and *scutellar scales* brilliant metallic green, reddish when seen in certain positions, some dark ones intermixed over wing-roots and on scutellum; scales on *apn* pale golden green, those on upper part of *ppn* purple, those on lower part and on *pleuræ* silvery. *Abdominal tergites* dark blue to purple, with usually narrow white basal bands on II–V, not always complete, V–VII with pale yellow lateral patches usually visible dorsally, tergite I purple in middle, pale yellow or white at sides, segments VI and VIII with pale yellow lateral hairs, VII with black, not forming conspicuous tufts; sternites pale golden, with a narrow longitudinal purple stripe. *Wings* slightly brownish, membrane distinctly clouded in the region of c.-vs. 2–3, 3–4, and 4–5, these three‡ being fairly

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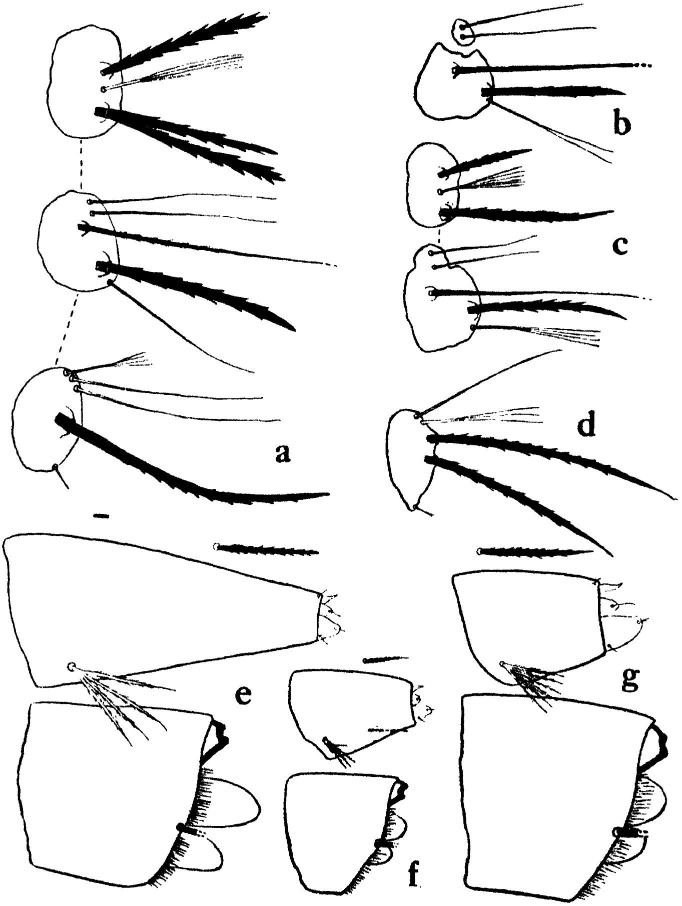
* Barraud 1929 *b*, p. 273; Senior-White 1923, p. 43, footnote.

† [A closely allied species is *M. manicatus* Edw. (Formosa), which differs from *M. albipes* in having the 5th tarsal segments white.]

‡ [In *Megarhinus* (as in *Anopheles*) the base of vein 3 is short and transverse and appears like a cross-vein; it is here for convenience referred to as "c.-v. 2–3." In this genus, moreover, the radio-medial cross-vein (3–4) is right angled, with a more or less extended horizontal portion and a horizontal stump arising from the angle; "c.-v. 3–4" here refers to the vertical portion only.]

closely approximated. *Legs* purple, with golden and white markings as follows :—Femora golden at bases and beneath, fore and mid-tibiæ with pale scaling posteriorly, 1st tarsal segment on all legs with basal pale ring, most distinct on mid and hind pair, apical ½ of segment 2, and whole of

Fig. 4.



Larval structures of *Megarhinus*. **a**, *M. edwardsi* Barr., dorso-lateral plates of prothorax (above), mesothorax (middle), and abd. seg. VII (below) ; **b**, *M. albipes* Edw., dorso-lateral plate of mesothorax ; **c**, *M. kempi* Edw., dorso-lateral plates of pro- and mesothorax ; **d**, *M. splendens* Wied., dorso-lateral plate of VII ; **e**, *M. gravelyi* Edw., siphon, chitinised part of anal segment, and (above) longer bristle of lateral plate of VIII, same scale as siphon ; **f**, same structures in *M. minimus* Theo ; **g**, same in *M. albipes* Edw.

3–5 on fore legs white, except part of 5 in some specimens, 2–5 on mid-legs entirely white; white scaling at apices of 2 and 3 on hind legs (in some specimens 2 is almost entirely dark), 4 entirely white, also base of 5.

♂.—Palpi slender and nearly as long as proboscis, purple, with yellow scaling at apex of segment 2, on sides of 3, and underside of 4, segment 5 nearly twice as long as 4; antennæ plumose, a small scale-tuft on 1st flagellar segment. Segment VII of abdomen with fairly long and dense lateral black hairs forming small tufts, lateral golden hairs on VIII.

Hypopygium: *9t* narrow, apical border not produced into lobes; *lp* with a few small teeth, very similar to that of *M. kempi*; style similar to that of *M. splendens.*

PUPA[†] (fig. 5, **a**).—Resembles that of *M. gravelyi* closely, but distinguished by shape of paddle, which is emarginate on the apical margin. Distinguished from pupæ of other species by characters given in key.

LARVA (fig. 4, **b**) (*vide* key).—The two parts of the mesothoracic dorso-lateral plate may occasionally be united by a narrow strip of chitin, but in all larvæ examined it is completely divided into two on one or both sides of the thorax. Approximate length (fully grown) 12–13 mm.; siphon 0·73–1·0 mm.; siphonal tuft with 4–7 branches.

HABITAT.—Tree-holes.

DISTRIBUTION.—WESTERN HIMALAYAS: Simla[*], 7–8,000′, viii. 1915 (*Christophers*), viii. & ix. 1923 (*Barraud*), viii. 1927 (*Puri*), ix., x., xi. 1930 (*Barraud*); Krol Mt.[*], near Solan, 7,000′, vii., viii., ix. 1923, ix. 1924, vii., viii. 1930 (*Barraud*); Dungagali[*], Hazara dist., 7,000′, v. 1915, and Muktesar[*], Almora dist., 7,000′, v. 1923 (*T. B. Fletcher*).

Outside India recorded from COCHIN CHINA (*Borel*).

2. **Megarhinus kempi** Edwards, 1921.

Bull. Ent. Res. xii, p. 72 (*Megarhinus* (*Toxorhynchites*) *kempi*) (♂ and ♀, ♂ hypop.). TYPE-LOC.: Telewadi, near Castle Rock, North Kanara dist., 3–10. x. 1916 (*S. Kemp*). TYPE: 1 ♂ and 1 co-type ♀ in Ind. Mus.; co-type ♀ in Brit. Mus.

ADULT[‡].—The leg-markings and coloration of abdomen serve to distinguish this species[§]; the ♂ differs from that of

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[*] Throughout this volume an asterisk against a distribution record indicates that specimens from the locality have been examined by the author.

[†] Barraud 1931 *a*, pp. 1130–1131.

[‡] Barraud 1929 *b*, p. 274.

[§] *M. kempi* closely resembles *M. leicesteri* Theo. from Malaya, the latter differing chiefly in having segments 2–5 of mid-tarsi of ♀ white, *9t* of ♂ hypopygium broader, and *lp* without serrations or teeth.

other Indian species in the presence of close-set bristles on underside of 1st hind tarsal segment. Wing about 6 mm.

♀.—*Head-scales* blue, greenish or purple, according to direction of light, those along eye-margins lighter; *antennæ* with moderately long sparse hairs; *palpi* purple, reaching to about tip of 5th flagellar segment; *proboscis* with straight basal part very stout and purple-scaled, curved apical part bluish-green or bronzy. *Mesonotal scales* brilliant green, scales on *scutellum* and over wing-roots bright bluish-green, on *apn* and upper part of *ppn* purple, on lower part of *ppn* and on *pleuræ* silvery. *Wings* without any definite clouding of membrane, c.-vs. 2–3, 3–4, and 4–5 closely approximated (fig. 1, **f**). *Legs*: femora purple dorsally, pale golden ventrally, small knee-spots of blue and white scales, tibiæ purple, some light blue scales intermixed on mid-pair, tarsi purple, with white markings showing some variation, a subbasal white ring on segment 1 on all legs, usually white scaling at base of segment 4 on fore leg, segment 4 of mid-tarsi white, also larger part of 5, sometimes white scaling at base of 2 and apex of 3, segments 4 and 5 of hind tarsi mainly white, with a few dark scales at the joint. *Abdominal tergites* mainly coppery purple, with narrow basal bright blue bands on II–IV or II–VI, and basal lateral silvery markings produced on to dorsum on IV–VI, tergite I bluish-green in middle, pale yellow at sides; sternites pale golden, IV purple in middle.

♂.—Palpi about as long as proboscis, first four segments mainly yellowish, 5th purplish; antennæ plumose; tarsi purple except for a pale ring near base of segment 1 on all legs, that on fore legs not always complete, segment 1 of hind tarsi with close-set bristles beneath for nearly the whole length. *Hypopygium* (fig. 6, **b**): 9*t* narrow, submedian hairy lobes not well developed; style narrow, with fairly long appendage; *lp* with a small number of minute teeth.

PUPA † (fig. 5, **c**).—Paddle of very distinctive shape and without an irregular dark line across the base (in these characters closely resembling *M. leicesteri* Theo. of Malaya).

LARVA (fig. 4, **c**) †.—Distinctive characters given in key; length of siphon 1·0–1·2 mm., siphonal tuft of 4–6 branches, bristle representing hair 8 on prothoracic dorso-lateral plate single (in some other species this bristle is invariably bifid).

HABITAT.—Bamboos.

DISTRIBUTION.—SOUTH INDIA: Nagargali*, Belgaum dist., viii. 1921, and Kadra and Yellapur*, N. Kanara dist., ix. & x. 1921 (*Barraud*); also type-locality* given above.

Outside India recorded from COCHIN CHINA (*Borel*); JAVA (*Brug*).

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† Barraud 1931 *a*, p. 1131; Brug 1932, p. 73.

3. **Megarhinus gravelyi** Edwards, 1921.

Bull. Ent. Res. xii, p. 73 (♂; ♂ hypop.). TYPE-LOC.: Pashok, Darjeeling dist., 2,000′, E. Himalayas, 26. v.–14. vi. 1916 (*F. H. Gravely*). TYPE: ♂ in Ind. Mus.

ADULT*.—A fairly large species without conspicuous lateral tufts on terminal segments of abdomen; leg-markings and coloration of abdomen distinctive †. Wing 6·5–7 mm.

♀.—*Head-scales* dull brownish purple, lighter along eye-margins, in certain positions the head appears mainly pale; *palpi* and basal stout part of *proboscis* purple, apical part of latter with greenish lustre, palpi reaching to about tip of 5th flagellar segment of *antenna*, latter with rather long sparse hairs. *Mesonotal scales* bright metallic green, those on upper parts of *apn* and *ppn* and *scutellum* coppery or purplish, those on lower parts of lobes and on *pleuræ* silvery, with yellow tinge. *Wings* with slight darkening of membrane in region of c.-vs. 2–3, 3–4, and 4–5, these fairly closely approximated, but more separated than in *M. kempi*. *Legs* purple, with golden and pale markings, femora golden on both sides ventrally and towards base, fore tibia with a large median pale area beneath, mid-pair with wide, nearly complete pale ring in same position, hind pair dark; 1st segment of fore tarsi with a wide basal pale ring, 2 mainly white, but some dark scaling near base, variable in extent, 3, 4, and base of 5 white, basal ½ of segment 1 of mid-tarsi white, also whole of 2, 3, 4, and base of 5, segment 1 of hind tarsi with a subbasal white ring, 4 entirely white (except in a form from Haflong, Assam, in which this segment is entirely dark). Dorsum of *abdomen* deep blue or deep purple, tergite I yellowish at sides, small lateral pale yellow patches on segments IV–VII, narrow basal pale yellow bands on segments II and III, sometimes on II–VI, sternite IV deep purple, remainder pale golden, with a narrow median dark longitudinal line.

♂.—Palpi slightly longer than proboscis, segment 2 purple at base, with apical pale yellow ring, 3 mainly yellow, with basal and apical dark rings, 4 and 5 purple, with pale yellow scaling at base of 4 beneath, 5 about twice length of 4. Tarsi purple except for pale markings at base of segment 1 on all legs, that on mid-leg usually forming a complete ring. *Hypopygium* (fig. 6, c): 9*t* with a pair of hairy submedian lobes, more pronounced and pointed in some specimens than in others; *lp* without obvious teeth.

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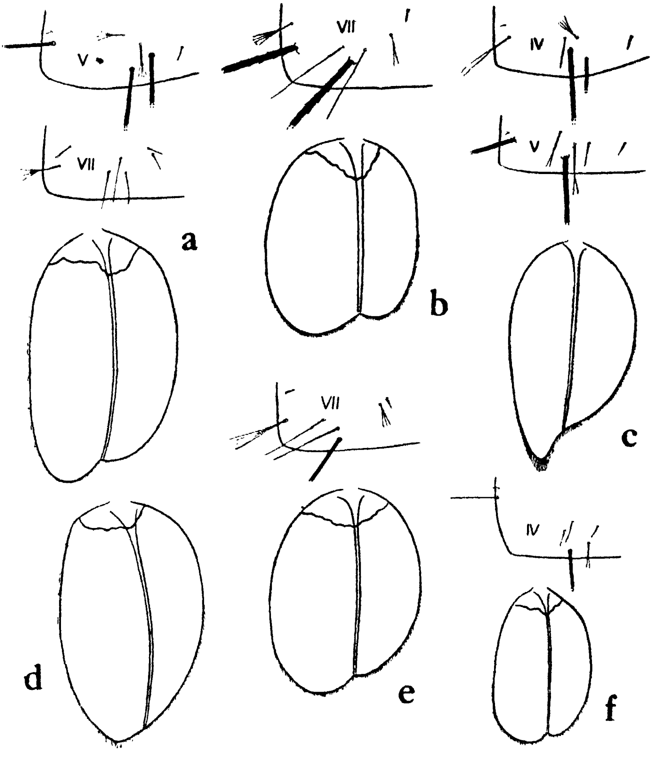
* Barraud 1929 *b*, p. 275.

† *M. gravelyi* resembles *M. metallicus* Leic. (Malay Penin.), but in that species the legs are unbanded in the ♂, and there are no extensive white markings on the legs of the ♀.

Pupa* (fig. 5, **d**).—Differs from that of all other Indian species in the shape of paddle, which is not emarginate on posterior border (in this respect resembling the pupa of *M. magnificus* Leic. of Malaya). In abdominal chætotaxy it agrees closely with pupa of *M. albipes*.

Larva (fig. 4, **e**)*.—Fairly easily separated from those of *M. albipes* and *M. minimus* (with which it agrees in having the mesothoracic dorso-lateral plate divided into two) by siphon being distinctly longer than chitinised part of anal segment. Length of siphon 1·2–1·5 mm., tuft 4-branched.

Fig. 5.



Pupal structures of *Megarhinus* (paddles and right halves of certain abdominal segments): **a**, *M. albipes* Edw.; **b**, *M. splendens* Wied.; **c**, *M. kempi* Edw.; **d**, *M. gravelyi* Edw.; **e**, *M. edwardsi* Barr.; **f**, *M. minimus* Theo.

Habitat.—Tree-holes and bamboos.

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* Barraud 1931 *a*, p. 1131.

DISTRIBUTION.—E. HIMALAYAS: Tindharia*, Mungpoo*, and Kurseong*, 3–5,000′, x. 1922 (*Barraud*), Darjeeling dist. ASSAM: Nongpoh*, Khasi Hills, vii. 1922 (*Barraud*); Haflong*, Cachar Hills, viii. 1922 (*Barraud*).

Also type-locality* given above.

Not recorded from elsewhere.

4. **Megarhinus minimus** Theobald, 1905.

Journ. Bomb. Nat. Hist. Soc. xvi, p. 237 (♂, pl. A, fig. 1). TYPE-LOC.: Yatiyantota, Ceylon, iii. 1902 (*Green*). TYPE: ♂ in Brit. Mus.

ADULT †.—Quite distinct on account of the small size and entirely dark tibiæ and tarsi ‡. Wing usually under 5 mm.

♀.—*Head-scales* mainly green or bluish-green, those along eye-margins lighter, either blue with violet reflections or nearly white; *palpi* and *proboscis* purple, sometimes with brassy sheen. *Mesonotal scales* metallic yellowish-green, some brilliant blue and green scales over wing-roots; *scutellar scales* green, scales of similar colour on upper borders of *ppn* and on *apn*, latter with bluish or purplish lustre when viewed in certain positions, scales on lower parts of *ppn* and on *pleuræ* silvery. *Legs* purple except for yellowish scaling at bases and on undersides of femora. Dorsum of first few segments of *abdomen* dark greenish-purple, remainder bright purple; indications of pale greenish basal bands on IV–VI or IV–VII, in some specimens tergites II–VII with lateral basal yellow markings, some quite small yellowish lateral tufts at apex of VI, similar tufts of mainly black hairs on VII and VIII; venter yellow, with dark scales on sternites IV, VII, and VIII, no median longitudinal dark stripe. In one specimen examined tergites IV–VII are brassy-brown.

♂.—Very similar to ♀, but antennæ sparsely plumose, palpi a little longer than proboscis, with some yellow scaling at apex of segment 2 and on sides and under-surface of 3 and 4. *Hypopygium*: *9t* strongly produced in middle into a shield-like plate bearing hairs laterally, style and appendage together about length of coxite, appendage about ¼ length of style; *bl* with one very strong hair about ½ length of coxite and some more slender hairs; *lp* narrow, with a few minute blunt teeth near apex.

PUPA § (fig. 5, f).—Fairly easily identified by characters given in key and by its comparatively small size.

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† Theobald 1907, p. 138; 1910, p. 109; Senior-White 1919, p. 189 (♀ desc.); Barraud 1929 *b*, p. 276.

‡ *M. gigantulus* Dyar & Shannon (Philippine Is.) is similar, but the lateral tufts on VII are orange instead of black.

§ Barraud 1931 *a*, p. 1131.

LARVA (fig. 4, f) †.—Comparatively small, siphon 0·7 mm. long, tuft of 2 or 3 branches, or occasionally represented by a single strong hair. Diagnostic points given in key.

HABITAT ‡.—Bamboos.

DISTRIBUTION.—S. INDIA: Yellapur* and Kadra*, N. Kanara dist., vii. 1907 (*T. R. Bell*) and ix. & x. 1921 (*Barraud*); Anamali Hills*, Madras Pres., 3,500′ (*Shaffi*). CEYLON: Colombo*, 1913 (*James*); Suduganga, iii. 1919 (*Senior-White*), and type-locality mentioned above.

Recorded from SUMATRA (*Brug*).

5. **Megarhinus edwardsi** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 999 (♂ & ♀). TYPE-LOC.: Solan, Krol Mt., W. Himalayas, 7,000′, viii. 1923 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Very distinct on account of the broad pale yellow border to the mesonotum. Wing about 7 mm.

♀.—*Head-scales* pale green on vertex, pale yellow along eye-margins; stout basal part of *proboscis* dark blue, apical slender part bronzy; *palpi* from $\frac{1}{5}$–$\frac{1}{6}$ length of proboscis, dark bluish; *mesonotum* with broad pale yellow border from front margin, along sides, over wing-roots to scutellum, disc covered with dark green metallic scales; scutellar scales greenish-blue; scales on *apn* and *ppn* and on *pleuræ* pale yellow; dorsum of *abdomen* dark metallic blue, tergites I, III, V, and VI with lateral pale yellow patches, III and V with incomplete medial pale bands, VI with pale yellow lateral tufts, VII with similar tufts of mainly golden hairs, VIII with small orange tufts, sternites II–V and VI pale, with a median longitudinal dark stripe, IV and VII nearly all dark; *wings* without definite clouding of membrane, c.-v. 2–3 nearer apex of wing than 3–4 by about 3 times its length. *Legs*: femora dark bluish-green, broadly yellowish beneath and at knee-joints, fore tibia dark green, with yellow scales beneath near apex, mid-tibia yellow, with an apical dark ring, a wide sub-apical yellow ring on hind tibia; segment 1 of fore tarsi dark above at base, yellow beneath, remainder and whole of segment 2 white, 3, 4, and 5 dark bluish, but a few pale scales at base of 3; basal $\frac{1}{2}$ of segment 1 of mid-tarsi yellow, the tip white, 3, 4, and the larger part of 5 white; hind tarsi dark bluish-green, segment 1 with subbasal yellow ring, 2 with wide basal white ring.

♂.—Palpi a little longer than proboscis, with pale yellow rings at base of segment 2 and near apex of 3; scutellar

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† Barraud 1929 *b*, p. 276.
‡ Senior-White 1920, p. 319.

scales dark blue ; hair-tufts on abdominal segment VII black instead of golden ; fore tibia entirely dark, mid-tibia yellow, with basal and apical dark rings, hind tibia with ill-defined subapical yellow ring ; fore tarsi with apical white ring to segment 1, 2 all white, basal white ring on 3, 4, and 5 dark blue. *Hypopygium* not examined (the type is the only ♂ known).

PUPA (fig. 5, e) †.—Very similar to *M. splendens*, differing only in the length of the larger lateral hair on segment VII.

LARVA (fig. 4, a) †.—Resembles *M. splendens*, but distinct on characters given in key. Siphon 1·0–1·2 mm. long, tuft usually of 5 branches.

HABITAT.—Tree-holes.

DISTRIBUTION.—W. HIMALAYAS, Krol Mt., 7,000′, near Solan*, viii. 1923 and vii. 1930 (*Barraud*) ; E. HIMALAYAS, Sureil*, Darjeeling dist., 5,300′, x. 1922 (*Barraud*).

Not known from elsewhere.

6. **Megarhinus splendens** (Wiedemann), 1819.

Culex splendens Wiedemann, Zool. Mag. 1, iii, p. 2 (♂). TYPE-LOC. : Java. TYPE : ♀ in Vienna Mus.

Culex regius Thwaites, in Tennent, 1859, ' Ceylon,' p. 268. TYPE-LOC. : Ceylon. TYPE : non-existent.

Megarhina (species from Sikkim) Giles, 1900, Handbook, 1st ed. p. 131. TYPE-LOC. : Himalayas, 1,800′, vi. 1896 (*G. C. Dudgeon*). TYPE : ♀ in Brit. Mus.

Megarhina immisericors Giles (nec Walker), Journ. Bomb. Nat. Hist. Soc. xiii, 1901, p. 604 (May).

Megarhina sikkimensis id., ib. TYPE-LOC. : Sikkim. TYPE : ♀ in Brit. Mus. (*G. C. Dudgeon*) (*vide* above).

Megarhinus immisericors Theobald (in part), M.C. i, p. 225, pl. vii. fig, 28.

Megarhinus gilesii Theobald, *ib.* p. 227 (Nov.), pl. ix, fig. 33. TYPE-LOC. : Upper Burma (*Watson*) and Sikkim (*Dudgeon*). TYPE : 3 ♀♀ and 1 ♂ from Burma, 1 ♀ from Sikkim (latter Giles's type of *M. sikkimensis*) in Brit. Mus.

Worcesteria grata Banks, 1906, Phil. Journ. Sci. i, pp. 780–782 (Sept.), pl. i, figs. 1–10 (in part ; type-series included specimens of both *M. splendens* Wied. and *M. amboinensis* Dol., latter not an Indian species). TYPE-LOC. : Negros Occidental and Cebu, Philippine Is. (*Banks, McGregor*). TYPE : number of specimens, both sexes, in Bureau of Science, Manila.

Toxorhynchites argenteotarsis Ludlow, 1906, Can. Ent. xxxviii, p. 367 (type ♀). TYPE-LOC. : Mindanão, Philippine Is. (*Dr. H. Newton Kierulf*). TYPE : ♀ in U.S. Nat. Mus.

ADULT (fig. 1) ‡.—This is the largest Indian species, distinguished from *M. edwardsi* by the absence of a wide pale

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† Barraud 1931 *a*, p. 1132.

‡ More important recent systematic references : Edwards **1913** *b*, p. 222 (syn. under *T. immisericors*) ; 1917, p. 202 (syn. under *T. regius*) ; **1922** *d*, p. 459 ; and **1929** *a*, p. 4 (syn. under *M. splendens*) ; Dyar & Shannon 1925, p. 66 (syn. under *M. amboinensis*) ; Barraud **1929** *b*, p. 277.

yellow margin to the mesonotum, and from other species by presence of well-developed lateral tufts of yellow, black, and orange hairs on terminal abdominal segments, and by leg-markings and general coloration of body, the dull bronzy scales* on dorsum of mesonotum being characteristic †. Wing 8·5–9 mm.

♀.—*Head-scales* green and blue with purple reflections, a narrow pale border to eyes; stout basal part of *proboscis* purple or dark blue, *palpi* purple, about as long as first six flagellar segments of *antenna*, latter with rather short, fine sparse hairs. *Mesonotal scales* dull bronzy or greenish-brown, lighter bluish or greenish scales at sides, scutellar scales and those over wing-roots bright bronzy or bluish-green; scales covering *apn* brassy with bluish reflections, or deep blue or green, on *ppn* bluish above, silvery below, on *pleuræ* silvery. Membrane of *wings* brownish especially anteriorly, scales at base of wing deep blue or purple, c.-vs. 3–4 and 4–5 much nearer the base of the wing than 2–3. *Legs*: fore and mid-femora purple, pale golden ventrally and posteriorly, hind pair mainly pale golden, purple dorsally on distal ½, fore tibia purple, with usually some pale golden scaling posteriorly, mid-pair mainly pale golden, purplish at base and apex, hind pair purple, with greenish reflections; tarsal markings variable, segments 3–5 on fore and hind tarsi dark, segment 1 of fore tarsi white, with basal dark ring and sometimes dark tip, a basal white ring on segment 2 variable in width; segments 1–5 on mid-tarsi sometimes entirely white except for a dorsal dark mark at base of 1 and a dark tip to 5, in some specimens the white markings reduced to a subbasal white ring on 1 and a basal white ring on 2 (numerous intermediate variations occur); segment 1 of hind tarsi dark or with yellow or white scaling, forming a more or less complete basal or subbasal ring, 2 often mainly white, but sometimes with a subbasal pale ring only. Specimens from the eastern parts of India usually show more extensive white markings than those from the west. Dorsum of *abdomen* dark blue or dark green, tergites I–III and V with lateral pale yellow patches visible dorsally, IV and VI with smaller similar markings; lateral outstanding tufts of hairs on VI–VIII, those on VI yellow and black, on VII black, on VIII orange; sternites II, III, V, and VI pale yellow with median purple line, IV, VII, and VIII mainly dark purple.

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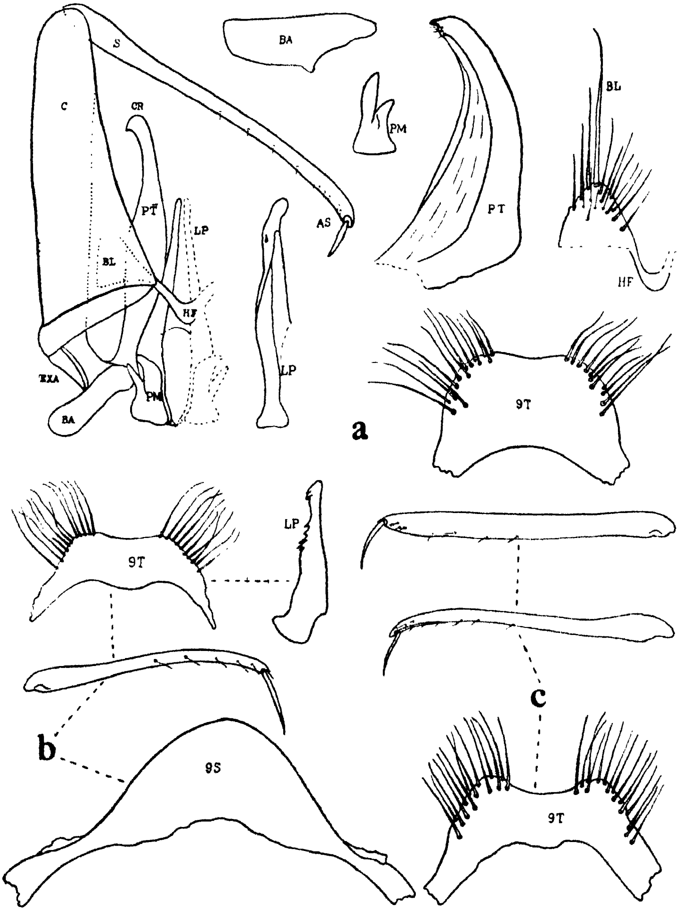
* [In some specimens, especially females, and more so in those from Java, the mesonotal scales appear much less dull, having a rather pronounced greenish-metallic gloss.]

† The most nearly allied species are *M. quasiferox* Leic. of Malaya, which differs in having tergite I entirely green, instead of dark blue or dark green in middle with pale lateral patches, and *M. subulifer* Dol. (*immisericors* Walk.), of Dutch East Indies, which differs only in markings on underside of abdomen. The last may only be a variety of *M. splendens* Wied. (*vide* Edwards, Bull. Ent. Res. xiv, p. 356, 1924). There has been a good deal of confusion regarding the synonymy of this species, but that given above appears now to be established, most of the types having been re-examined in recent years. It should be noted that *M. splendens* Wied. *as described by Theobald* is now regarded as a synonym of *M. aurifluus* Edw., 1921, from Formosa.

Fig. 6.



♂ hypopygial structures of *Megarhinus*: **a**, *M. splendens* Wied. **b**, *M. kempi* Edw. **c**, *M. gravelyi* Edw. (with variation in shape of style). Lettering as on p. 4.

♂.—*Palpi* about length of proboscis, purple, with yellow or white scaling at apex of segment 2 and near apex of 3, variable in extent; *antennæ* densely plumose, 1st flagellar segment with tuft of scales. *Tarsi*: segments 3–5 on all legs dark, fore tarsi entirely dark or with pale scaling at bases of segments 1 and 2 beneath, mid-tarsi with pale scaling near base of 1 sometimes forming a wide ring, II with basal white ring very variable in width, segment 1 of hind tarsi dark or with pale scaling at base, 2 with wide basal or sub-basal white ring. *Hypopygium* (fig. **6, a**): *9t* wide and only very slightly emarginate on apical border; *lp* without marked serrations.

PUPA (fig. 5, **b**)*.—Diagnostic points given in key; of the five submedian and sublateral hairs one is long and black on tergites 2, 6, and 7, and two on tergites 3, 4, and 5; larger lateral hair on segments 2–7 long.

LARVA (figs. 2, 3, 4, **d**) † (*vide* key).—Length when fully grown from 15–16 mm.; colour crimson or deep reddish-brown; length of siphon-tube 1·1–1·5 mm., tuft with 4–8 branches; ventro-lateral plate on I sometimes divided into two; head and chitinised parts of body in larval skin deep rich brown.

HABITAT ‡.—Tree-holes, bamboos, and sometimes in domestic collections of water such as water-butts, jars, etc.

EGG §.—Green states that the eggs are scattered singly and separately on the surface of water and do not tend to run together in strings. The egg is of a regular oval form, 0·55 mm. long by 0·37 mm. broad; of a creamy-white colour; surface closely studded with spinous granules, some of which are larger than the rest and disposed at more or less regular intervals. Each of these larger granules has a prominent apical point. This granular formation doubtless accounts for the buoyant manner in which it floats, the whole contour of the egg being visible above the surface-film. When the larva hatches, the egg divides transversely across the equator; the empty halves float on the surface, with the convexity upwards.

DISTRIBUTION.—Common along the HIMALAYAN foothills from Dehra Dun (U.P.) to the north-east boundaries of Assam, through ASSAM and BURMA, to the ANDAMANS; in BENGAL, BIHAR, Orissa down to the Madras boundary; on the west coast from Savantvadi State to TRAVANCORE and CEYLON.

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* Barraud 1931 *a*, p. 1132; Edwards 1926 *a*, p. 115.

† Barraud 1931 *a*, p. 1131; Theobald 1903 *a*, p. 118; Senior-White 1927, p. 66.

‡ Green 1905, p. 160; Paiva 1910, p. 187; Senior-White 1920, p. 319.

§ Green 1905, p. 160.

It has not, so far, been found in Central India nor west of a line drawn from Simla to Ratnagiri (on the coast south of Bombay).

Outside India its range extends through the MALAY PENINSULA and islands, SIAM, COCHIN CHINA, PHILIPPINES, and HONG KONG.

SEASONAL PREVALENCE.—Throughout the greater part of the year in South India and Ceylon, and as far north as Calcutta; further north and in the north-east it is most abundant during the monsoon.

Tribe CULICINI.

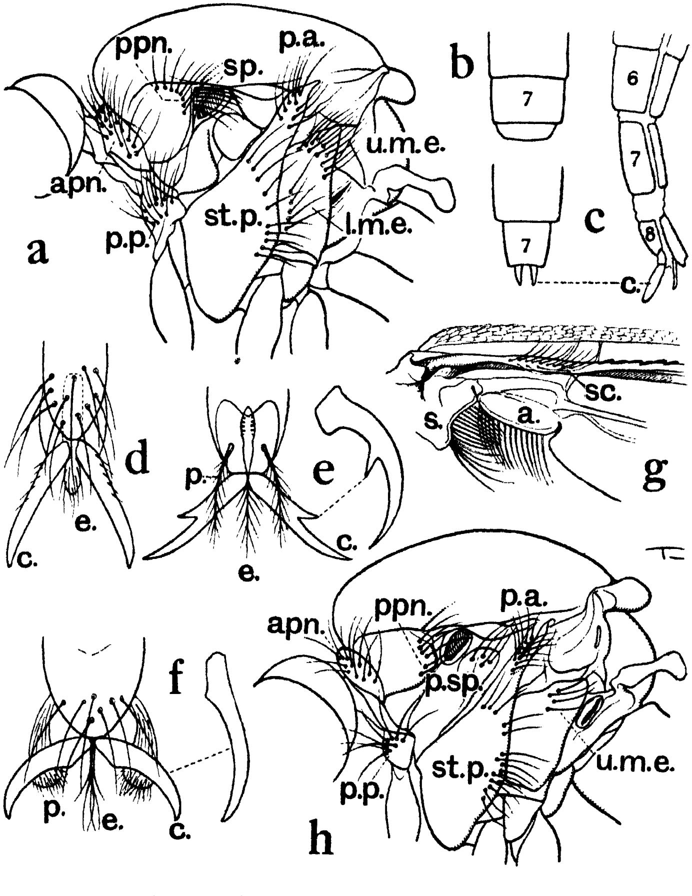
This tribe is represented in India by fifteen genera, several of which are divided into subgenera, according to the classification adopted in this work. The number of species at present known is 239, and rather more than half these are included in the larger genera *Aëdes* and *Culex*. The characters now used for the separation of genera, and applicable to both sexes of the adult, are often rather obscure, and are to be found chiefly in the pleural chætotaxy and in the venation of the wing. Other characters, such as scaling and length of palpi, have also been taken into consideration, but these are used much less than formerly, as it has been found that a good deal of variation occurs sometimes in these respects in closely allied groups of species. The presence or absence of pulvilli and of hairs on the squama of the wing are also of importance in distinguishing certain genera. The structure of larvæ and pupæ, which often shows more definite generic characters than the adults, has also been applied.

Subgeneric divisions are more often based on characters present only in the ♂ sex (structure of hypopygium, length of palpi, etc.). In the larger genera *Aëdes* and *Culex* the larvæ do not show well-marked subgeneric characters, and such characters are sometimes not very definite in the adult ♀♀.

For general remarks on classification and grouping of genera of the world the reader is referred to Edwards (1932), pp. 63–65.

CHARACTERS : ADULT.—Mosquitoes variable in size, but not as large as the majority of Megarhine species, and including some very small forms. Usually less highly ornamented with coloured scales than the Megarhinini, though silvery metallic, blue, green, or violet scales are present in some of the smaller species. Clypeus longer than broad, rounded above and in front. Proboscis flexible and nearly always uniformly slender and not hooked, but sometimes swollen at tip. Palpi of ♀♀ never as long as proboscis, those of ♂♂ of very variable length. Scutellum more or less trilobed and with three

Fig. 7.



Tribe Culicini: generic characters of adults.

a, side view of thorax, showing chætotaxy, genus *Theobaldia*.
h, ditto, genus *Aëdes*.
apn, anterior pronotal lobe and bristles; *ppn*, posterior pronotal lobe and bristles; *pp*, propleural bristles; *sp*, spiracular bristles; *psp*, postspiracular bristles; *stp*, sternopleural bristles; *pa*, prealar bristles; *ume*, upper mesepimeral; *lme*, lower mesepimeral.
b and **c**, tip of abdomen of ♀ *Culex* and *Aëdes* respectively: 6, 7, 8, abdominal tergites VI, VII, and VIII; *c*, cerci.
d, **e**, and **f**, tip of last tarsal segment of *Theobaldia*, *Aëdes*, and *Culex* respectively: *e*, empodium; *p*, pulvilli; *c*, claw.
g, base of wing from beneath, genus *Theobaldia*: *s*, squama, with fringe of hairs; *a*, alula (also fringed); *sc*, base of subcostal vein bearing hairs.

separate groups of bristles. Hind margin of wing without a V-shaped thickening. Abdomen with tergites and sternites covered with scales, which usually lie flat on the surface. Hypopygium of ♂ usually with well-developed paraprocts (chitinisations of anal segment); phallosome without leaflets, but often with chitinised lateral plates bearing teeth.

PUPA.—Paddle usually with one terminal hair (two in *Culex*, but none in *Tripteroides*, *Topomyia*, *Harpagomyia*, most *Ficalbia* and *Mansonia*). Outer part of paddle not usually produced beyond termination of midrib, but, should it have this appearance, the hind margin is either serrated, or with terminal hair, or the respiratory trumpet ends in a chitinised spine, or is divided nearly to the base into leaflets.

LARVA.—Mouth-brushes composed of hairs, of which the median series have, in many species, serrations on one side apically; not usually prehensile, except in *Aëdes* (*Mucidus*) and *Culex* (*Lutzia*), in which the hairs are modified into somewhat hooked lamellæ, 30 or more in number in each brush (in *Megarhinus* the brush consists of ten lamellæ arranged in a line). Clypeus with six pairs of hairs, in addition to a pair of preclypeal spines. The character and relative positions of hairs *A*, *B*, *C*, *d*, and *e* are of importance. The sixth pair is nearly always very small and lies on the front of the clypeus slightly external and dorsal to the preclypeal spines. Chætotaxy of thorax and abdomen variable*. In some forms one or more pairs of strong spines are present on the thorax. Segment VIII of abdomen with comb of teeth on each side (absent in Megarhinini), and a siphon-tube arising from dorsum, having respiratory openings and movable valves at its tip, and one or more pairs of hairs or hair-tufts along its length (occasionally these are very small). Siphon with or without pecten. Anal segment with either a chitinised saddle or completely enclosed in a ring of chitinisation; two pairs of subdorsal hairs, one pair of lateral hairs, two pairs of papillæ surrounding the anal opening, and a ventral fan of hairs (occasionally reduced to one pair).

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* [The thoracic and abdominal chætotaxy has not yet been closely studied in the various genera of Culicini; it is practically certain that in all genera of this tribe the same set of hairs exists as in Megarhinini and also in Anophelini, but the development of the individual hairs varies very greatly in different genera and species. The thoracic chætotaxy of *Tripteroides*, *Aëdes*, and *Culex* is illustrated in figs. 9, 39, and 102 respectively. Among points of distinction between Culicini and Megarhinini it may be noted that hair 8 is apparently never associated with the pleural hairs (9–12) in Culicini, as it is in Megarhinini; hairs 5–7 of prothorax and 4–6 of mesothorax are not included in one chitinous plate, hair 1 of mesothorax is never duplicated, and hair 14 is present.]

EGG.—The eggs of Indian Culicini have been very little studied. They are longer than wide, with hard shell, without lateral floats, and more or less fusiform in shape, not roundly oval or spiny, as in the Megarhinini. Those of many species are able to resist desiccation over long periods. They may be laid singly, or cemented together in the form of rafts.

KEYS TO GENERA.

Adults.

1.	Margin of squama fringed (fig. 7, **g**) (fringe usually complete, but interrupted in some small species); vein 6 ending well beyond level of fork of vein 5 (figs. 21, 32, 34)	2.
	Margin of squama quite bare (fig. 13, **b**); vein 6 short, usually ending at about level of fork of vein 5 (figs. 13, 15)	15.
2.	Pulvilli present (fig. 7, **f**); bucco-pharyngeal armature present in ♀ (fig. 80, **a–g**) (spiracular and postspiracular bristles absent)	CULEX, p. 332.
	Pulvilli absent or rudimentary (fig. 7, **d**, **e**) bucco-pharyngeal armature absent in ♀ (fig. 80, **h–k**)	3.
3.	Postspiracular bristles absent (fig. 7, **a**)	4.
	Postspiracular bristles present (fig. 7, **h**)	13.
4.	Spiracular bristles present (from 3–10) (fig. 7, **a**)	5.
	Spiracular bristles absent (fig. 7, **h**)	6.
5.	Fairly numerous hairs on underside of wing at base of vein *sc* (fig. 7, **g**); large mosquitoes; palpi of ♂ long, the tips spatulate	THEOBALDIA, p. 86.
	Base of vein *sc* without such hairs; small mosquitoes; palpi of ♂ quite short, like those of ♀	TRIPTEROIDES, p. 34.
6.	*apn* lobes enlarged and approximated behind head; mesonotum without dorso-central or prescutellar bristles	7.
	apn lobes of normal size and well separated; dorso-central and prescutellar bristles well developed	8.
7.	Postnotum bare (♂♂ of Indian species unknown)	HÆMAGOGUS, p. 309.
	Postnotum with group of small hairs; antenna of ♂ with last two segments very long	HEIZMANNIA, p. 299.
8.	Postspiracular area with scales; tarsal claws of ♀ usually toothed (palpi of ♀ ½, or more, length of proboscis)	ARMIGERES (LEICESTERIA), p. 320.
	Postspiracular area bare; claws of ♀ simple	9.
9.	All segments of antennæ of ♀, and last two of antennæ of ♂, short and thick (fig. 32); femur of middle leg with tuft of scales at tip	AËDOMYIA, p. 131.
	Antennæ normal, slender; femur of middle leg without scale-tuft	10.

10.	First segment of fore tarsi longer than last four together; 4th very short in both sexes, shorter than 5th (fig. 21, **b**); wings spotted as in many species of *Anopheles* (fig. 21, **a**)	ORTHOPODOMYIA, p. 94.
	First segment of fore tarsi not longer than last four together; 4th not shortened in ♀; wings not spotted, but may be speckled	11.
11.	Fork-cells of wing short, anterior being only about ⅓ length of stem; palp of ♂ clubbed at apex	FICALBIA (MIMOMYIA), p. 105.
	Fork-cells of wing not unusually short, anterior being about length of stem; palpi of ♂ not clubbed at apex	12.
12.	Small mosquitoes with comparatively large wing-scales; proboscis of ♂ greatly widened towards apex (fig. 27, **h**); that of ♀ slightly enlarged	FICALBIA (part), p. 105.
	Larger yellow or yellowish-brown mosquitoes; wing-scales normal; proboscis not enlarged	MANSONIA (COQUILLETTIDIA), p. 119.
13.	Wing-scales unusually broad, and many asymmetrical; tergite VIII of ♀ with a row or patch of short tooth-like spines (fig. 30); apical segment of palpi of ♂ minute; claws of ♀ simple	MANSONIA (MANSONIOIDES), p. 123.
	Wing-scales not unusually broad and not asymmetrical; tergite VIII of ♀ without spines; apical segment of palpi of ♂ usually of moderate length; claws of ♀ usually toothed	14.
14.	Proboscis rather stout, somewhat laterally compressed, and turned downwards towards tip (fairly large dark species, with flat scales on vertex and scutellum).	ARMIGERES (ARMIGERES), p. 313.
	Proboscis fairly slender and straight; ornamentation and scaling very various.	AËDES, p. 134.
15.	Wing-membrane with very small microtrichia requiring a magnification of more than 80 for their detection; anterior fork-cell usually very short (fig. 15)	URANOTÆNIA, p. 56.
	Wing-membrane with microtrichia, as usual, visible under a magnification of 50 or less, anterior fork-cell not usually very short	16.
16.	Proboscis very hairy and much enlarged at tip (fig. 12, **b**)	HARPAGOMYIA, p. 47.
	Proboscis not hairy and not enlarged	17.
17.	Wing-scales emarginate at tips (fig. 13, **c**).	HODGESIA, p. 52.
	Wing-scales normal	TOPOMYIA, p. 45.

Larvæ (4th stage)*.

1.	Ventral fan or brush of anal segment represented by a single pair of hairs (fig. 12)	2.

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* Larvæ of Indian species of *Hæmagogus* and *Topomyia* are unknown.

Ventral fan of anal segment of more than 2 separate hairs .... 3.

2. Metathorax with a long spine on each side (fig. 9) .... TRIPTEROIDES.
Metathorax without long spines .... HARPAGOMYIA; [TOPOMYIA.

3. Antenna very large, somewhat flattened; siphon hairy all over, and with a pair of very long subposterior branched hairs, the branches longer than siphon (fig. 33). AËDOMYIA.
Antenna not very large and not flattened; siphon not usually hairy all over; siphonal hair-tufts with branches of only moderate length or quite small .... 4.

4. Siphon with several subposterior hair-tufts usually arranged in pairs .... CULEX.
Siphon with not more than one pair of subposterior hair-tufts .... 5.

5. Siphonal valves modified for piercing tissues of aquatic plants (figs. 31, a) ...... MANSONIA.
Siphonal valves not modified for piercing (but compare *Ficalbia hybrida*, p. 112) . 7.

7. Hair-tufts on siphon very near base of tube (figs. 14, 20) .... 8.
Hair-tufts on siphon near middle of tube or towards apex...................... 9.

8. Antennal tuft not much beyond middle; size large .... THEOBALDIA.
Antennal tuft at $\frac{5}{6}$ from base; size small . HODGESIA.

9. Siphon without pecten .... 10.
Siphon with pecten .... 12.

10. Abdominal segment VIII with lateral chitinised plates more or less developed (sometimes also on VII); comb of alternating large and small teeth in a row .. ORTHOPODOMYIA.
Abdominal segments VII and VIII without lateral chitinised plates; comb-teeth all about same size .... 11.

11. Antenna comparatively short, with smooth shaft and with a small hair representing antennal tuft (fig. 75) .... ARMIGERES.
Antennæ fairly long, with small spicules on shaft and a large branched hair-tuft (figs. 25–27) .... FICALBIA (part).

12. Segment VIII with lateral chitinised plates (*vide* figs. 16, 54) .... 13.
Segment VIII without lateral chitinised plates............................. 14.

13. Pecten-teeth usually with fringe, or lateral denticles on both sides from base to apex (fig. 16).......................... URANOTÆNIA.
Pecten-teeth usually with or without a few lateral denticles near base on one side only (fig. 54) .... AËDES (some species of [STEGOMYIA).

14. Pecten-teeth few (1–4) and simple (without lateral denticles); both *osc* and *isc* with a number of branches .... FICALBIA (part).
Pecten-teeth usually fairly numerous, and majority with lateral denticles; *osc* usually single and long .... AËDES (most species); HEIZMANNIA; (?) HÆMAGOGUS.

Genus **TRIPTEROIDES** Giles, 1904.

Journ. Trop. Med. vii, p. 368. Genotype, *Runchomyia philippinensis* Giles.

Rachionotomyia Theobald, 1905, Journ. Bomb. Nat. Hist. Soc. xvi, p. 248. Genotype, *R. ceylonensis* Theo.

Colonemyia Leicester, 1908, Cul. Malaya, p. 233. Genotype, *C. cæruleocephala* Leic.

Skeiromyia id., ib. p. 248. Genotype, *S. fusca* Leic.

Squamomyia Theobald, 1910, Rec. Ind. Mus. iv, p. 28. Genotype, *S. inornata* Theo.

Tricholeptomyia Dyar & Shannon, 1925, Insec. Insc. Mens. xiii, p. 72. Genotype, *Wyeomyia nepenthicola* Banks.

Until very recently this genus has been known as *Rachionotomyia*, but Edwards (1932) has adopted the present name, which was suggested, but not adopted, by Giles in 1904, and has given an up-to-date definition of the genus. It is now divided into four subgenera, of which only one, *Tripteroides* (s. str.), is represented in India. The characters of the adults, larvæ, and pupæ, common to the Indian species, are given below. The eggs of these are at present unknown.

ADULT* (fig. 8).—Small mosquitoes with slender legs, proboscis usually long and slender, sometimes as long as whole body, palpi quite short in both sexes, usually about $\frac{1}{6}$ length of proboscis or less (*T. edwardsi* about $\frac{1}{4}$); antennæ of ♂ moderately plumose, with last two segments elongate, those of ♀ slender, with segments of flagellum of about equal length, hairs fairly long; eyes touching for some distance above antennæ; head mainly flat-scaled, some upright scales on nape; one pair of strong occipital bristles separated from small lower orbital bristles; thoracic bristles reduced, 1 posterior pronotal, 3–6 spiracular, no postspiracular, no lower mesepimeral, usually none along upper border of sternopleura, some large patches of flat scales on pleuræ; *apn* fairly large but well separated, flat-scaled; mesonotal scales variable in form in different species, either narrow and almost hair-like or distinctly broad, bristles few, dorso-central series sometimes absent, giving the thorax a smooth appearance; scutellar scales flat; postnotum usually with a pair of slight furrows and without setæ (except in *T. edwardsi*). Fork-cells of wing moderately long, vein 6 terminating nearer tip of wing than commencement of 2 and fork of 5; squama with some hairs. Legs slender, hind tibia shorter than others, segment 1 of hind tarsi usually longer than tibia, fore tarsal claws of ♂ unequal, the larger with a blunt tooth (except in *T. powelli* var. *indica*), claws of ♀ simple. Abdomen of ♀ with hairs and bristles at tip, but few hairs on other segments; hypopygium of ♂ (fig. 10) rather prominent, coxite comparatively small, with hairy lobe on anal surface and long terminal style carrying a small, stout appendage at its tip, 9*t* produced into a pair of well-developed submedian lobes carrying strong bristles, which may be flattened, resembling leaflets in some species, paraproct with a few strong teeth at crown and a few minute hairs, phallosome resembling an incomplete tube, feebly chitinised, sometimes with a few minute teeth at apex.

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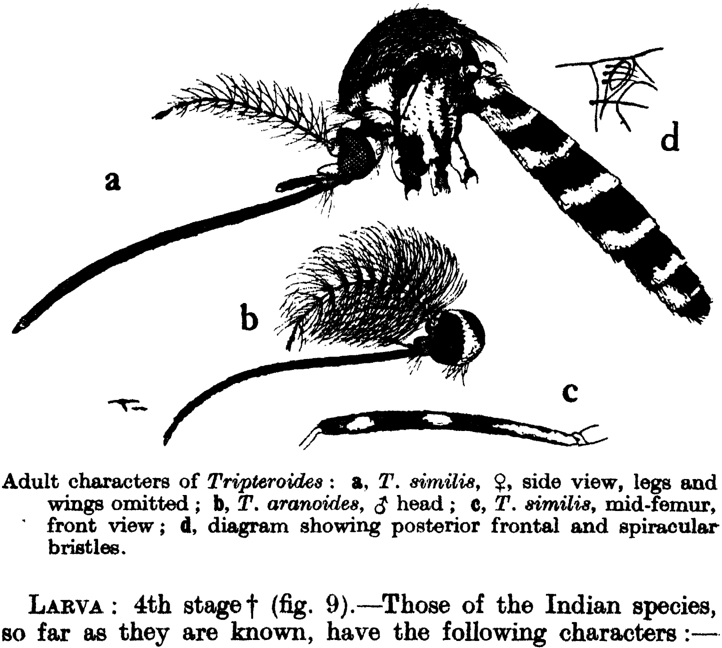
* Edwards 1921 *c*, p. 283; 1924, p. 359; 1932, p. 73; Barraud 1929 *a*, p. 1058; Barraud & Covell 1928, p. 676 (buccal cavity).

PUPA* —Paddles small and bluntly pointed, without terminal hair or fringe, but some very small hairs on posterior border near termination of midrib, conspicuous lateral branched hairs on outer posterior corners of VII and VIII, those on VIII extending beyond tip of paddle, long single hairs on IV–VI or IV–VII.

Fig. 8.



Adult characters of *Tripteroides* : **a**, *T. similis*, ♀, side view, legs and wings omitted ; **b**, *T. aranoides*, ♂ head ; **c**, *T. similis*, mid-femur, front view ; **d**, diagram showing posterior frontal and spiracular bristles.

LARVA : 4th stage† (fig. 9).—Those of the Indian species, so far as they are known, have the following characters :— Head small, antenna quite short and comparatively stout ; a double dorso-lateral black spine on each side of metathorax [representing hair 7], a pair of smaller, single spines on mesothorax [also representing hair 7] ; hair 5 also thickened in some species ; propleural group of hairs (9–12) latero-ventrally placed, so that the tubercle is almost or quite visible from above, almost as well-developed as mesopleural and metapleural groups; hair 12 of metapleural group small but distinct; hair 6 of mesothorax on plate with 7, on pro- and metathorax separate; hair 8 of mesothorax not very large]; numerous stellate hairs on thorax and abdomen [those on dorsum of thorax representing hairs 0 and 1 of prothorax, 1 of mesothorax, and 1 and 3 of metathorax]; a comb of rather

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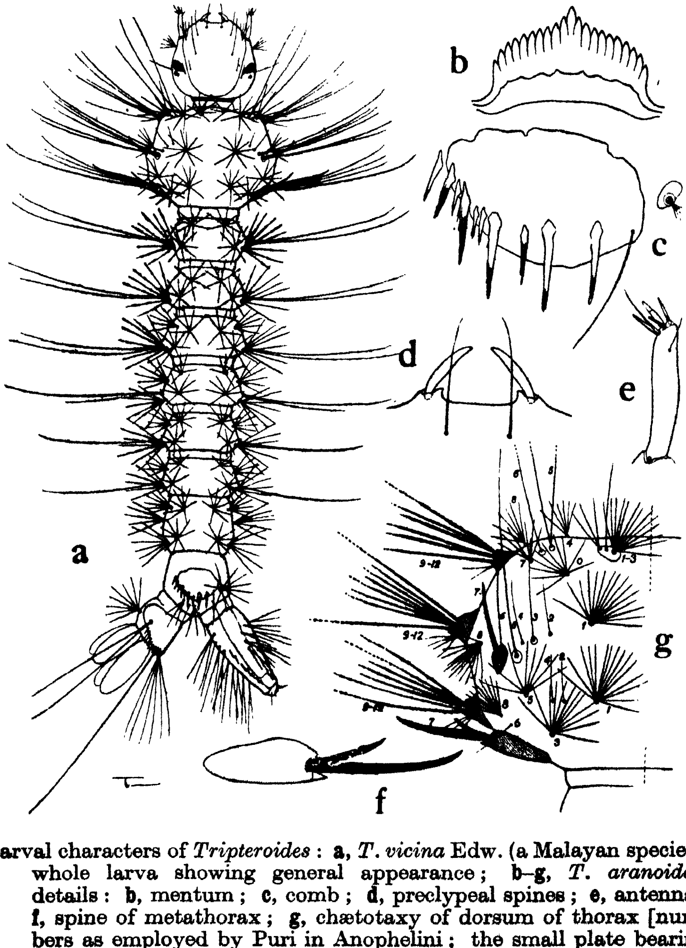
* de Meijere 1910, p. 930 ; Brug 1931 p. 20 ; Edwards 1932, p. 74.

† Edwards 1921 *c*, p. 283 ; 1926 *b*, p. 398 ; 1932 (see also under *aranoides*).

Fig. 9.



Larval characters of *Tripteroides*: **a**, *T. vicina* Edw. (a Malayan species), whole larva showing general appearance; **b–g**, *T. aranoides*, details: **b**, mentum; **c**, comb; **d**, preclypeal spines; **e**, antenna; **f**, spine of metathorax; **g**, chætotaxy of dorsum of thorax [numbers as employed by Puri in Anophelini; the small plate bearing hairs 1–3 of prothorax is shown too large; hairs 9–12 are the pleural hairs of pro-, meso-, and metathorax borne on strong tubercles; hair 7 on meso- and metathorax is transformed into a spine; hair 13 (not shown in figure) is a large stellate hair, ventral in position and far removed from the pleural tubercle.]

large teeth on either side of segment VIII set in a single but sometimes irregular row, siphon-tube of moderate length, tapering towards tip, some fairly long hairs along posterior border of tube from base to apex arranged more or less in a double row, either 2-branched or single, the pair nearest the base usually divided into several branches, similar single or double hairs irregularly arranged over the lateral and anterior surfaces, pecten consisting of a row of fine bristle-like teeth commencing some distance from base and continued nearly to apex, a chitinised saddle on anal segment enclosing dorsum and sides, some strong spines on posterior border, *osc* single, *isc* branched, lateral hair very long and either single or 2-branched, anal fan absent, being represented by one pair of branched hairs; fully-grown larva about 7 mm. long.

BIONOMICS *.—Little is known of the habits of these species in India. The adults are most probably diurnal, but never appear to be abundant or troublesome. Senior-White states that ♀♀ of *T. aranoides* do not bite, that he has seen adults at flowers of *Mikania scandens* at dusk in February on the Suduganga Estate in Ceylon, and by day on the windows of a bungalow. Most of the species are found in forest or jungle during the rains, but *T. aranoides,* which is by far the commonest, may breed near human habitations where suitable conditions exist. They are mainly bamboo-breeders, but the larvæ of *T. aranoides* have been found in water in a hollow *Erythina*-tree (*Senior-White*), and also very commonly in pitcher-plants in Malaya; those of *T. affinis* occurred in a tree-hole at Belgaum (*Barraud*). The larvæ of *T. aranoides,* and probably those of other species, can be fairly easily separated from those of other bamboo-breeders by the pale creamy colour of the body, against which the numerous black stellate hairs can be clearly seen.

DISTRIBUTION.—The subgenus *Tripteroides* occurs in the south-western, southern, and eastern parts of the Indian area, including Ceylon. Further east it extends through Malaya, Cochin China, Japan, Australian region, Philippines, and Fiji. Five species have been found in India up to the present.

Key to Adults.

1.	Femora spotted	2.
	Femora unspotted	3.
2.	Anterior pronotal lobes covered with flat silvery scales	*similis*, p. 38.
	Anterior pronotal lobes with a row or two of small flat brown scales	*powelli* var. *indicus*, [p. 39.

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* de Meijere 1910, p. 928; Senior-White 1920, p. 320; Buxton & Hopkins 1927, p. 76; Dover 1928, p. 23.

3. Mesonotum with a continuous white-scaled margin from front, along sides, over wing-roots to scutellum, postnotum with well-marked tuft of setæ .... *edwardsi*, p. 41.
   Mesonotum without a white margin, postnotum bare .... 4.

4. White scales on *ppn* and pleuræ, a narrow blue border to eyes .... 5.
   Brown scales on *ppn*, silvery scales on pleuræ, a wide deep blue border to eyes.. *affinis*, p. 44.

5. Light scales forming a lateral straight border to tergites for length of abdomen. *aranoides*, p. 42.
   Light scales forming lateral triangular patches, or a serrated border, to tergites for length of abdomen .... *aranoides* var. ***serrata***, [p. 43.

Key to known Larvæ.

Comb of about 20 teeth, subequal in size, and set in a close row .... *affinis*.

Comb of 10 or 12 teeth, of which about 5 are larger than remainder, a few towards dorsum widely spaced: ventral hairs of anal segment branched .... *aranoides*.

Comb of 5 large teeth; ventral hairs of anal segment single....................... *dofleini*, p. 45.

Key to Pupæ.

Sublateral hairs on posterior border of tergite VII all comparatively small and extending only slightly beyond posterior margin of that segment, ends of branches of larger lateral hair on VII not extending to outer posterior corner of tergite VIII .... *aranoides*.

One or two sublateral hairs on posterior margin of tergite VII comparatively long and reaching as far as posterior margin of VIII, ends of branches of larger lateral hair on VII extending to, or beyond, outer posterior corner of VIII .... *affinis*.

7. **Tripteroides similis** (Leicester), 1908.

Colonemyia similis Leicester, Cul. Malaya, p. 235 (♂ & ♀). Type-loc.: Bukit Kutu, Malay Penin. (*Leicester*). Type: ♂ and co-type ♀♀ in Brit. Mus.

Adult*.—Distinguished by silvery scales on *apn*, each femur marked with two silvery spots, no dorso-central bristles on mesonotum, the scales on this part narrow, metallic scales on scutellum, and wing-scales fairly broad and rather dense †. Wing 3·3–3·6 mm.

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* Barraud 1929 *a*, p. 1060 (*Rachionotomyia*).

† [*T. ænea* Edw. (Malay) and *T. plumosa* Brug. (Sumatra) are similar, but have brown scales on *apn*; the latter has a tuft of scales at end of ♂ style.]

♀.—*Head*: a patch of deep blue scales on vertex, wider in front than behind, remainder of head clothed with brownish-black scales except for a patch of white scales laterally, some dark upright scales on nape, antennæ with pale pubescence on shaft, hairs dark brown, torus brown, clypeus, palpi, and proboscis dark brown, palpi about $\frac{1}{7}$ length of proboscis, latter very long, as long as whole body. *Thorax*: mesonotal scales narrow and many hair-like, greenish-brown or yellowish-brown, no dorso-central bristles, flat bronzy-green scales on scutellum, flat silvery scales on *apn*, a large black area in middle of pleuræ surrounded by brown, mainly covered with patches of silvery scales. *Wings* fairly densely clothed with rather broad scales. *Legs*: tibiæ and tarsi dark brown, unbanded, all femora marked with two silvery spots on anterior surface, one near apex and one near middle, the medial one on hind femur not always very distinct, being sometimes confluent with a silvery marking running from base. *Abdomen* dark purplish or bronzy, with large lateral silvery patches extending on to dorsum to form narrow apical bands on II–V or II–VI.

♂.—Very similar to ♀, antennæ moderately plumose, palpi only about $\frac{1}{9}$ length of proboscis. *Hypopygium* (fig. 10, **c**): lobes of 9*t* wide and armed with a number of flattened spines or leaflets, style enlarged on apical $\frac{1}{2}$ and comparatively short.

PUPA, LARVA, and EGG.—Unknown.

HABITAT.—Bamboos (*Barraud*).

DISTRIBUTION.—In India recorded only from DARJEELING DIST., Sureil * and Mungpoo *, *c.* 5,000′, x. 1922 (*Barraud*); Sukna * and Marianbarrie Estate *, 500′, viii. 1928 (*Sobha Ram*).

Known also from the MALAY PENINSULA and ARCHIPELAGO.

8. **Tripteroides powelli** (Ludlow), 1909, var. **indicus** (Barraud), 1929.

Uranotænia powelli Ludlow, Can. Ent. xli, p. 235 (♀). TYPE-LOC.: Camp Wilheim, Yayabas, P.I., 3. i. 1909 (*W. A. Powell*). TYPE: ♀ in U.S. Nat. Mus.

Rachionotomyia powelli (Ludl.) var. *indica* Barraud, Ind. Journ. Med. Res. xvi, p. 1061 (♂ & ♀, ♂ hypop., figs.). TYPE-LOC.: Sukna, Darjeeling dist., 500′ (*Sobha Ram*), viii. 1928. TYPE: ♂ & ♀ in M.S.I. coll., Kasauli.

ADULT †.—The following characters taken together distinguish this species from its nearest allies in India and

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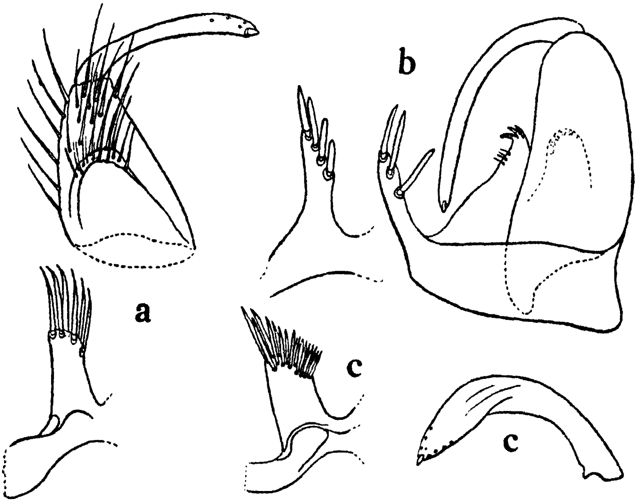
† Theobald 1910 *b*, p. 519 (*Uranotænia*); Dyar & Shannon 1925, p. 72 (*Rachionotomyia*).

Malaysia *:—Coloration of mesonotal integument, presence of dark brown scales on *apn*, all femora marked with two silvery spots, larger tarsal claw of fore leg of ♂ simple, presence of several pairs of dorso-central bristles on mesonotum, wing-scales not very dense and fairly narrow. Wing about 2·5 mm.

♀.—*Head* : a broad area of flat metallic deep blue scales on anterior ½ of dorsal surface, extending to sides, the straight posterior margin of this area bordered with deep violet or brownish-black scales, a patch of silvery scales low down at each side ; clypeus, palpi, proboscis, and antennal hairs dark brown, proboscis slender, about length of whole body, palpi about ¼ length of proboscis. *Thorax* : integument of prescutum and scutellum light brown, of scutum and postnotum dark brown, several pairs of dorso-central bristles, mesonotal scales narrow and yellowish, with a few darker ones

Fig. 10.



Hypopygial details of *Tripteroides* : **a**, *T. powelli* var. *indica*, coxite and style from inside, half of tergite ; **b**, *T. aranoides*, whole hypopygium, side view ; **c**, *T. similis*, half of tergite, style.

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* [Allied Oriental species are : (1) *monetifera* Dyar (Philippines), *apn* with narrow golden scales ; (2) *hybrida* Leic. (Malaya) and (3) *nitidiventer* Giles (Philippines), *apn* with flat blue scales ; (4) *bambusa* Yam. (Japan) and (5) *vicina* Edw. (Malaysia), thoracic integument blackish, only narrowly pale on front margins, *bambusa* having a slight notch, *vicina* a distinct tooth on larger front claw of ♂ (NOT *vice versa*, as stated in Edwards's key, 1922 *d*, p. 444) ; (6) *cœruleocephala* Leic. and (7) *proxima* Edw. (Malaysia), thoracic integument all yellowish, these two also differing in front claws of ♂.]

intermixed, scutellar scales rather small, flat, and dark brown, integument of pleuræ of mesothorax black, an oval dark area around anterior spiracle, pleuræ of prothorax and metathorax, and coxæ pale yellowish, a large area of brilliant silvery scales covering larger part of sternopleura and mesepimeron, a row or two of flat dark brown scales on *apn*, a few dark hair-like scales on *ppn*. *Wing-scales* not very dense, and mainly rather narrow. *Legs* : markings as in *T. similis*. *Abdomen* : tergites brownish-black, with yellowish or bronzy sheen, large lateral silvery patches not usually forming complete bands on dorsum, venter pale yellowish.

♂.—Antennæ moderately plumose, wing about 2·3 mm., larger claw of fore tarsi simple. *Hypopygium* (fig. 10, **a**) : lobes of 9*t* longer and narrower than in *T. similis*, each armed with about six flattened bristles or leaflets.

LARVA, PUPA, and EGG.—Unknown.

HABITAT.—Bamboos (*Barraud*).

DISTRIBUTION of var. *indica*.—ASSAM : Golaghat *, Sibsagar dist. (*Christophers*) ; Nongpoh *, Khasi Hills, vii. 1922 (*Barraud*). DARJEELING DIST., Sukna *, 500′, x. 1922 (*Barraud*) and viii. 1928 (*Sobha Ram*). UPPER BURMA : Maymyo *, viii. 1930 (*R. C. Wats*).

The type-form is known only from the Philippine Islands †.

9. **Tripteroides edwardsi** (Barraud), 1929.

Heizmannia edwardsi Barraud, Ind. Journ. Med. Res. xvii, p. 264 (♀). TYPE-LOC. : Yellapur, N. Kanara dist., x. 1921 (*Barraud*). TYPE : one co-type ♀ in Brit. Mus., one co-type ♀ in M.S.I. coll., Kasauli.

ADULT.—Distinct on account of the border of white scales to mesonotum and presence of setæ on postnotum. Wing-length 3·8–4 mm.

♀.—*Head* : a wide area of flat grey scales on vertex, a narrow pale border to eyes, and a large pale patch at each side of head, a few dark upright scales on nape, tori with some pale scales on inner sides, flagellar segments and hairs dark, clypeus pale grey, palpi and proboscis black with dark bluish sheen, palpi about ¼ length of proboscis, latter of only moderate length. *Thorax* : mesonotal scales broad, very dark brownish-grey on disc, a border of white scales along sides, over wing-roots to scutellum, scales over wing-roots large, no dorso-central bristles, scutellar scales broad and flat, white on lateral

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† No specimens of the type-form are available for comparison, but according to the description it differs from the variety in having the mesonotal scales dark brown. It should be noted that several other closely related species occur in Malaysia.

lobes, mostly dark on mid-lobe, a well-marked tuft of setæ on postnotum, dull white scales on *apn*, flat white scales (not silvery) almost entirely covering pleuræ, including *ppn*, postspiracular area, sternopleura, and mesepimeron. *Legs*: tibiæ and tarsi brownish-black, unbanded, fore and mid-femora dark on anterior surface, mostly pale posteriorly, hind femur white on both sides, except along dorsal edge, knee dark. *Abdomen* deep brownish-black with large irregular lateral white patches, widest towards apex of each segment, not forming bands over dorsum.

♂ and early stages unknown.

HABITAT.—Bamboos (*Barraud*).

DISTRIBUTION.—Known only from type-locality.

10. **Tripteroides aranoides** (Theobald), 1901.

Wyeomyia aranoides Theobald, M.C. ii, p. 274 (♀). TYPE-LOC.: Taiping, Perak, Malay Penin. (*Wray*), 22. xi. and 21. xii. 1899. TYPE: ♀ in Brit. Mus.

Rachionotomyia ceylonensis Theobald, 1905, Journ. Bomb. Nat. Hist. Soc. xvi, p. 248 (♀). TYPE-LOC.: Peradeniya, Ceylon (*Green*), x. 1901. TYPE: ♀ in Brit. Mus.

Skeiromyia fusca Leicester, 1908, Cul. Malaya, p. 248 (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus. (from larva in bamboos).

Squamomyia inornata Theobald, 1910, Rec. Ind. Mus. iv, p. 28 (♂). TYPE-LOC.: west slopes of Dawna Hills, Lower Burma, 2–3,000′ (*Annandale*), 2 or 3. iii. 1908. TYPE: ♂ in Ind. Mus.

Ficalbia tenax de Meijere, 1910, Ann. Jard. Bot. Buitenzorg (2), Supp. iii, p. 928 (♂ & ♀, adult, larva, and pupa). TYPE-LOC.: Tjibodas, Java. TYPE: Amsterdam Mus.

var. *serrata* Barraud (of *R. aranoides*), 1929, Ind. Journ. Med. Res. xvi, p. 1059. TYPE-LOC.: Nagargali, Belgaum dist., viii. 1921 (*Barraud*). TYPE: ♂ & ♀ in M.S.I. coll.

ADULT *.—The only other Indian species with which this could be confused is *T. affinis*, but the two are distinct on characters given in key †. Wing 3·2–3·4 mm.

♀.—*Head*: mainly covered with large dark brown flat scales, a narrow border of blue scales along eye-margins, palpi and proboscis dark brown, with sometimes a bronzy sheen, palpi about $\frac{1}{6}$ length of proboscis, latter long and slender, longer than abdomen, clypeus partly covered with white scales. *Mesonotum* covered with broad dark greyish-brown scales, no dorso-central bristles, scutellar scales flat and dark greyish-brown, white scales on *apn* and *ppn*, similar white scales (not silvery) almost covering pleuræ, integument brown or yellowish. *Legs* dark brown, unbanded, undersides of femora lighter. Dorsum of *abdomen* brownish-black with dark bluish sheen, white scales on venter appearing bluish in some positions ; whitish scales on sides of tergites *.

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* Theobald 1907, p. 518, and 1910 *b*, p. 529 (*Squamomyia*); Edwards 1913 *b*, p. 241, and 1922 *d*, p. 462 (syn.); Barraud 1929 *a*, p. 1059.

† [Another similar Oriental species is *nepenthis* Edw. (Malaya), with shorter proboscis, only one claw on hind tarsi, and clypeus bare.]

♂.—Resembles ♀ except for more plumose antennæ. *Hypopygium* (fig. 10, **b**) : 3–4 strong spines on lobes of 9*t*, as in *T. affinis*.

Pupa †.—Points of difference from *T. affinis* given in key.

Larva ‡.—Preclypeal spines strong, curved, and pointed, arising from slight prominences of preclypeus. *Frontal hairs* all fine and single (except *A*, which is usually 2-branched), 3 pairs placed well forward, a fourth pair, longer than others, further back, posterior to level of bases of *antennæ*, latter short and stout, shaft smooth, a single hair at about ⅘ length from base, 2 small preapical spines very near tip, 2 small spines at apex, and a papilla. *Mouth-brushes* moderately developed, median hairs slightly hooked, and with minute serrations apically. *Mentum* narrow from before backwards, with large central tooth and 8–10 smaller on each side. Numerous stellate hairs on *thorax* and abdomen, each hair with about 12 branches, the tips apparently blunt, but actually ending in several minute points, some long lateral hairs also on thorax and abdomen ; a strong single, slightly barbed spine on mesothorax dorso-laterally, a longer double strong spine arising from a large chitinised tubercle on metathorax, one arm longer than the other, actual length of spine, and of shorter arm compared with longer, variable, but longer arm usually twice or more length of shorter, both arms sharp-pointed. *Comb* of 10–12 pointed teeth, of which about five are larger than others, a few towards dorsum widely spaced ; indications, in most specimens, of a feebly chitinised lateral plate from which the comb arises. *Siphon* usually darker in middle than towards base and apex, a narrow dark ring at base, no acus, length of tube about 0·5–0·7 mm., 2½–3 times length of width at base ; a double row of 2-branched hairs along posterior margin, the pair nearest base usually 4-branched, scattered single and 2-branched hairs on lateral and anterior surfaces ; *pecten* of 5–8 fine teeth, pointed and minutely fringed, commencing some distance from base of tube and continued nearly to apex. *Anal segment* enclosed dorsally and laterally with chitinised saddle, posterior margin of which carries 9–12 rather long sharp spines, *osc* single, smooth, and long, *isc* with 5 or 6 fairly long branches, all about same length, *lh* about same length as *isc* and either 2- or 3-branched or single, pair of ventral hairs representing fan or brush each with 5–6 shorter branches, both pairs of anal papillæ nearly as long as lateral hair, tips slightly rounded.

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* In the type-form the line separating the dark and light parts of the abdomen is serrate, in the var. *serrata* it is jagged, the white area on each tergite being broader towards the base.

† de Meijere 1910, p. 930.

‡ Edwards 1926 *a*, p. 116 ; Senior-White 1927, p. 66 ; Edwards & Given 1928, p. 337 ; Brug 1931 *b*, p. 15.

HABITAT.—Bamboos, occasionally tree-holes. In Malaysia found very commonly in pitcher-plants (*de Meijere*; *Given*; *Dover*) †, as well as bamboos (*Leicester*).

DISTRIBUTION.—S. INDIA: Nagargali *, Belgaum dist., vii. 1921 (*Barraud*); Yellapur * and Kadra *, N. Kanara dist., x. and xi. 1921 (*Barraud*); Nilgiri Hills *, x. 1915 (*Khazan Chand*). DARJEELING DIST.: Sureil * and Mungpoo *, *c.* 5,000′, x. 1922, and Sukna *, 500′, x. 1922 (*Barraud*). ASSAM: Shillong *, vi. & viii. 1922, 5,000′, Haflong *, Cachar Hills, viii. 1922, and Golaghat *, Sibsagar dist., v. 1925 (*Barraud*); Khumtai * Sibsagar dist., v. 1925 (*Christophers*). BURMA: Rangoon *, i. 1920 (*Christophers*), and 1930 (*Feegrade*); west slopes of Dawna Hills *, iii. 1908 (*Annandale*). ANDAMAN Is. *, vii. 1926 (*Sobha Ram*). CEYLON: Peradeniya, x. 1901 (*Green*); Colombo *, 1913 (*James*); Matale *, Suduganga Estate, xi. 1919 (*Senior-White*).

Also known from MALAYA, COCHIN CHINA, BORNEO, and JAVA.

11. **Tripteroides affinis** (Edwards), 1913.

Rachionotomyia affinis Edwards, Bull. Ent. Res. iv, p. 241 (nom. nov.).

Phoniomyia cæruleocephala Theobald, 1910, M.C. v, p. 577 (♂ & ♀, ♀ wing fig.). TYPE-LOC.: Hakgala, Ceylon, iii. 1907 (*Green*). TYPE: ♂ & ♀ in Brit. Mus. (nec *Colonemyia cæruleocephala* Leicester, 1908, Cul. Malaya, p. 233).

ADULT.—Very similar both in markings and in structure of ♂ hypopygium to *T. aranoides*, but may be distinguished by the characters given in the key ‡. It should be noted that the scales on the pleuræ are distinctly silvery, a very unusual character among those species of the subgenus *Tripteroides* which lack spots on the femora.

PUPA.—Distinguished from *T. aranoides* by characters given in key.

LARVA.—Resembles *T. aranoides*, except as follows:—Comb of more numerous teeth, about 20 in a close-set row; spine on mesothorax, and both arms of spine on metathorax, ending in several minute points.

HABITAT.—Tree-holes (*Barraud*).

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† [Larvæ from pitcher-plants differ in some respects (chiefly in the smaller number of branches of various hairs) from those described above from bamboos, and it may be that two species or races are involved (Edwards 1926, p. 117).]

‡ *Vide* Barraud 1929*a*, p. 1060.

DISTRIBUTION.—S. INDIA: Santi Kappa*, Coorg, v. 1914 (*T. B. Fletcher*); Nilgiri Hills*, x. 1915 (*Khazan Chand*); Belgaum*, Bombay Deccan, viii. 1921 (*Barraud*). CEYLON: Hakgala, *c.* 6,500′, iii. 1907 (*Green*); Peradeniya, v. 1912 (*J. C. F. Fryer*); Rakwara, v. 1929 (*Henry*).

Not known from elsewhere.

[12. **Tripteroides dofleini** (Günther), 1913.

Zeitschr. Wiss. Ins.-biol. ix, pp. 204–7 and 259–269 (larva and pupa only). TYPE-LOC.: Udugama, Ceylon (*Günther*). TYPE: Freiburg-i.-Br. (?).

ADULT.—Unknown.

LARVA.—Very fully described and figured by Günther; in most respects closely resembles those of *T. aranoides* and *T. affinis*, but seems to differ from both in having only 5–6 branches in the abdominal stellate tufts. As, however, the number of branches in these tufts is liable to increase with the age of the larva, and the stage of Günther's larvæ is not clearly stated, it is possible that they may prove to be second- or third-stage larvæ of *T. aranoides*. The following features noted in the original description may be of specific importance:—Median hairs of mouth-brush strongly combed. Mentum with about 13 approximately equal teeth. Metathoracic spine with a short basal branch, barely ⅓ as long as the main spine, tip of latter slightly rounded, not split into points. Comb of 5 large, widely-spaced teeth (smaller ventral teeth not mentioned). Ventral hairs of anal segment single; *isc* with 2 branches only; *osc* finely barbed; *lh* single.

HABITAT.—Pitchers of *Nepenthes destillatoria*.

DISTRIBUTION.—Recorded only from type-locality.]

Genus **TOPOMYIA** Leicester, 1908.

Cul. Malaya, p. 238. Genotype, *T. minor* Leic.

Pseudograhamia Theobald, 1910, Rec. Ind. Mus. iv, p. 26. Genotype, *P. aureoventer* Theo.

ADULT †.—Small mosquitoes with slender legs; thorax usually ornamented with a median silvery stripe, and with silvery scales on *apn*, scutellum, and pleuræ. Microtrichia on wing-membrane of normal size, squama without hairs; wing-scales normal and not emarginate at tips; clypeus unusually small; antennæ alike in the two sexes, not strongly plumose, segments of flagellum subequal in length; palpi quite short in both sexes, proboscis not hairy, about as long as abdomen, apparently bent under the body when insect is at rest; scutellum unusually small.

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† Theobald 1910 *b*, p. 551; Edwards 1922 *d*, p. 437; 1932, p. 90; Brunetti 1914, p. 72; Barraud 1929 *b*, p. 270.

LARVA †.—[Some Malayan species are very similar to *Harpagomyia*, but *T. argenteoventralis*, which is closely allied to the Indian species, has a very peculiar larva, with the maxilla modified into a strong horn, siphon with long ventral spines, and anal papillæ very long and slender.]

BIONOMICS ‡.—Adults are usually found near jungle-streams (*Leicester*); none has yet been found sucking human blood; larvæ breed in water in bamboos and leaf-bases and flowers of certain plants.

DISTRIBUTION.—The genus is purely Oriental; about 13 species are known, and nearly all these occur in Malaya; one of these has also been found in South India.

13. **Topomyia aureoventer** (Theobald), 1910.

Pseudograhamia aureoventer Theobald, Rec. Ind. Mus. iv, p. 27 (♀). TYPE-LOC.: Pallode, 20 miles north-east of Trivandrum, Travancore (*N. Annandale*). TYPE: ♀ in Ind. Mus.

ADULT §.—May be identified on generic characters and on markings, as given below ||. Wing 3·5 mm.

♀.—*Head*: flat-scaled, a large triangular patch of silvery scales in middle of vertex, remainder covered with brownish-black scales; palpi quite small, clothed with pale scales; proboscis black, slightly swollen at tip. *Thorax*: mesonotum deep brown, with a median silvery line of flat scales, lateral areas of ochreous narrow scales towards the front extending to bases of wings; flat silvery scales on *apn*, pleuræ, and mid-lobe of scutellum, flat golden scales on *ppn*. *Legs*: brownish-black, femora paler beneath. *Wings* with rather scanty dark scales, forks rather long, with broadish scales; vein 6 scarcely beyond level of base of fork of 5. *Abdomen*: laterally compressed, large lateral apical silvery patches on tergites I, II, IV, V, and VI (none on others) not forming complete bands on dorsum, sternites dull golden.

♂ and early stages unknown (see note under genus).

DISTRIBUTION.—In India known only from type-locality* given above, and from Virajpet*, COORG, 20–24. x. 1915 (*T. B. Fletcher*).

Also occurs in MALAY PENINSULA.

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† Brug 1931 *b*, p. 8; Edwards 1932, p. 90.

‡ Leicester 1908, p. 239; Brug 1913 *b*, p. 8; Edwards 1932, p. 90.

§ Edwards 1913 *b*, p. 240, and Barraud 1929 *b*, p. 270 (as *T. argenteoventris*); Theobald 1910 *b*, p. 551 (*Pseudograhamia*).

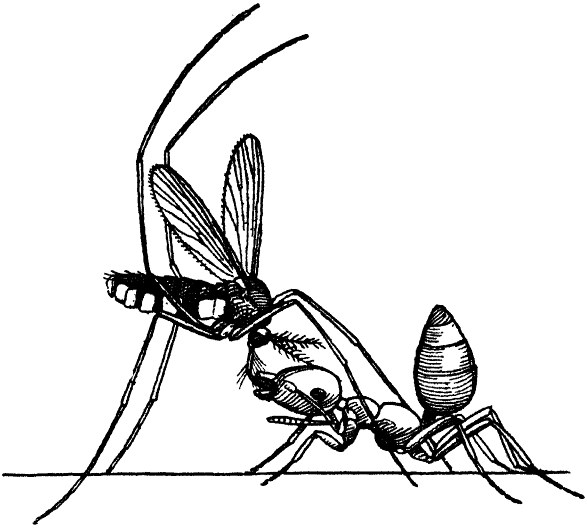
|| It differs from *T. argenteoventralis*, with which it was at one time confused, by the absence of a large patch of silvery scales on the dorsum of the 2nd abdominal tergite and shorter 5th vein. For distinctions between the various other Malayan species, see Edwards 1932 *d*, p. 438.

Genus **HARPAGOMYIA** de Meijere, 1909.

Tijd. v. Ent. lii, p. 165. Genotype, *H. splendens* de Meij.
Malaya Leicester, 1908, Cul. Malaya, p. 258 (nec *Malaia* Heller). Genotype, *M. genurostris* Leic.

This genus includes only two Indian species*. They are small mosquitoes ornamented with brilliant silvery, blue or violet scales ; the hairy proboscis is peculiar in having a flexible joint and a very much enlarged tip carrying four long hairs (fig. 12, **b**). This character alone distinguishes these mosquitoes from all other Culicinæ.

Fig. 11.



Harpagomyia taking food from mouth of an ant (*Cremastogaster*). (After Jacobson ; reproduced by permission of Messrs. F. Warne and Co. from ' Standard Natural History.' The raised hind tibia of the mosquito is shown too long in the figure.)

PUPA †.—Distinguishing characters are given below under *H. genurostris*.

LARVA ‡.—In 4th stage this resembles those of *Topomyia* and *Tripteroides* in the absence of an anal fan or brush, but differs from the latter in the absence of large spines on the thorax There do not appear to be any constant characteristics by which the larvæ may be distinguished from those of *Topomyia*. Important points of structure are given in the descriptions below.

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* See also Theobald 1910 *b*, p. 547 ; Edwards 1922 *a*, pp. 496–503, 1930 *b*, p. 543, and 1932, p. 91 ; Barraud 1926 p. 348 ; Barraud & Covell 1928, p. 676 (buccal cavity).

† de Meijere 1911, p. 162.

‡ de Meijere 1911, p. 162 ; Ingram & de Meillon 1927, p. 76 ; Evans 1929, p. 407.

BIONOMICS *.—The following details are given by Edwards (1932):—Larvæ have been found in tree-holes, in old water-filled nests of tree-dwelling ants, in leaf-bases of pineapple and other plants. The habits of the adults are of exceptional interest, and were first observed in detail by Jacobson in Java, having been confirmed subsequently by James in Ceylon and Farquharson and others in tropical Africa. The flies haunt tree-trunks where ants of the genus *Cremastogaster* are found, and obtain their food from the ants; the proboscis of the mosquito is evidently highly specialized for this purpose, and they probably do not feed in any other way. The *Harpagomyia* places itself directly in front of an advancing ant, sometimes even nipping the ant between its front legs (fig. 11), and not releasing it until it stops and opens its jaws, when the mosquito thrusts the swollen tip of its proboscis into the ant's mouth and rapidly absorbs the food offered. While the interchange is taking place the ant strokes the tip of the mosquito's proboscis with its palpi. When not in use, the proboscis of the mosquito is folded backwards under the body —a most unusual position in this family. Whilst feeding, the wings are vibrated and the hind legs held high so that the tarsi curve forwards over the head, as in *Wyeomyia* and related genera.

DISTRIBUTION.—In India the genus appears to be confined to the warmer southern and eastern regions of heavy rainfall. Two other species are known from the Oriental region, and four from Tropical Africa.

14. **Harpagomyia genurostris** (Leicester), 1908.

Malaya genurostris, Cul. Malaya, p. 258 (♂). TYPE-LOC.: Malay Penin., caught in bungalow (*Dr. Daniels*). TYPE: ♂ in Brit. Mus.

ADULT †.—Differs from *H. jacobsoni* in having clypeus yellowish-white, a line of silvery scales between eyes, a larger silvery patch laterally on tergite IV, and scales of *apn* and on front of vertex silvery white, with only a faint bluish tinge. Wing 2·2–2·4 mm.

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* Jacobson 1909 *a*, p. 246; 1909 *b*, pp. 158–164; 1911, pp. 158–161; de Meijere 1909, p. 169; 1911, pp. 162–167; James 1914, p. 233; Farquharson 1918, pp. xxix–xxxix; Edwards 1932, p. 92.

† See also Edwards 1913 *b*, p. 240, and 1930 *b*, p. 543; Barraud 1926, p. 349.

♀.—*Head*: a subtriangular patch of silvery flat scales in middle of vertex in front, with a slight bluish or violet tinge in some specimens, the scales continued as a narrow line downwards between eyes, a patch of similar scales at each side of head, remainder covered with brownish-black flat scales, a wide space separating the two vertical bristles from the lower orbital bristles; antennæ dark brown, a little longer than proboscis, hairs fairly long; clypeus fully twice as long as width at base, rather pointed and beak-like, yellowish, with silvery pruinescence; palpi a little longer than clypeus, pale yellow or creamy; proboscis comparatively short, about 1·1 mm., mainly yellow, except the swollen part, which is brown. *Thorax*: integument of mesonotum dark brown, clothed with brown narrow scales, a sharply-defined median line of flat bluish-violet scales with metallic lustre from front margin to about middle of mesonotum; postnotum and pleuræ dark brown, latter, as well as coxæ, almost entirely covered with flat silvery scales, those covering *ppn* with a yellowish tinge, on *apn* with a bluish or purplish tinge. *Wings*: dark scaled, termination of vein 6 usually a little nearer tip of wing than level of fork of 5 and base of 2, but in some specimens it ends at about level of those points, *af* longer than *pf*. *Legs*: dark brown, undersides of femora paler, all legs with yellowish sheen when seen in certain positions, segment 1 of hind tarsi a little longer than tibia. *Abdomen*: tergites brownish-black, with large lateral silvery patches on I and II and IV–VI, that on IV being larger than others, those on V and VI apical, VII nearly all silvery, venter silvery with yellowish sheen.

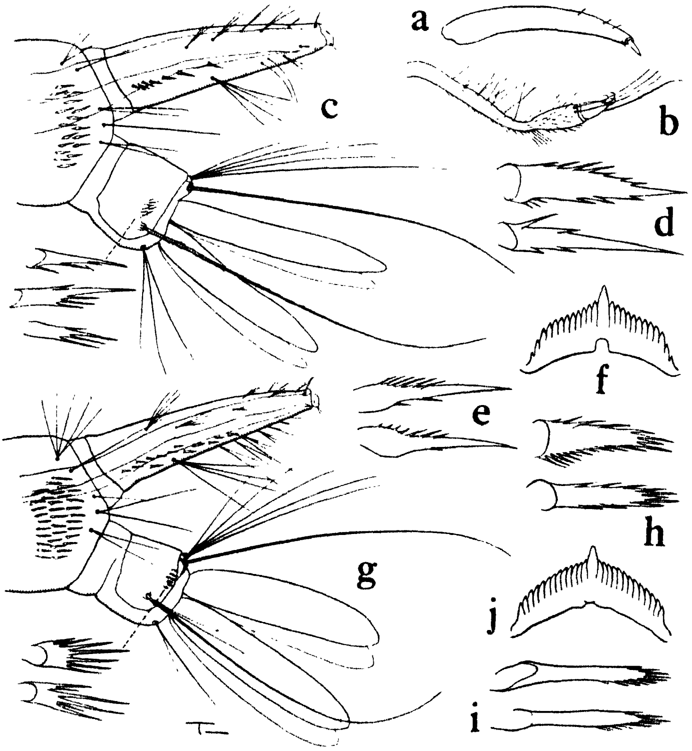
♂.—Integument of mesonotum usually rather lighter than in ♀, and the median silvery purple line not always so well pronounced, only tip of swollen apex of proboscis definitely dark; vein 6 usually ending beneath fork of 5 and base of 2 or slightly nearer base of wing than this. Antennæ similar to those of ♀. *Hypopygium*: 9*t* with a pair of submedian hairy lobes; coxite short and broad, a basal lobe on inner side bearing 4 strong bristles in a row and 2 similar bristles above, style (fig. 12, **a**) moderately long with short terminal appendage; *lp* with small teeth at apices; paraprocts pointed, without teeth or hairs.

Pupa.—Paddles feebly chitinised, semi-transparent, somewhat triangular and pointed, without terminal fringe or hair, part inside midrib rather narrow; lateral tufted hair on outer posterior corners of VII and VIII well developed; one of the hairs on posterior borders of V and VI long and single, corresponding hair on IV also single and moderately long; dendritic tufts on tergite I only moderately developed;

respiratory trumpet short, about 3 times length of width, of normal shape.

LARVA (fig. 12, g–j).—*Head*: towards front of clypeus there are three pairs of fine hairs in a somewhat convex row, the outer (*A*) and inner each 3-branched, the mid single or 2-branched; posterior to these there is a pair of single or 2-branched fine hairs internal and slightly posterior to *A* and at about level of bases of antennæ; posterior to these four pairs there is a fine hair on each side at about level of upper margin of eye; preclypeal spines moderately long and stout, tips pointed. Antenna short, slightly curved, shaft smooth, a single hair some little distance from tip, several apical bristles. A number of median hairs of mouth-brush

Fig. 12.



Harpagomyia genurostris: style of ♂ hypopygium (**a**) and proboscis (**b**); also details of larval structure of *H. jacobsoni* (**c**–**f**) and *H. genurostris* (**g**–**j**): **e**, **i**, comb-scales; **d**, **h**, pecten-teeth.

hooked, and with minute serrations on one side apically. Mentum narrow from before backwards, a fairly large median tooth and 12 smaller on each side. *Thorax*: lateral tufted hairs well developed, two fan-shaped tufts, one larger than the other, on prothorax, arising from tubercles. *Abdomen*: lateral tufted hairs on segments I and II fairly long, those on following segments with fewer branches; comb composed of about 40 teeth in a large subtriangular patch. *Siphon* about 0·7 mm. long, slightly curved and tapering, about 4 or 5 times length of basal width; scattered hairs over surface, one pair with 4 or 5 fairly long branches towards posterior margin at about middle, a few 2- or 3-branched hairs on anterior and lateral surfaces, and a row of single and some smaller branched hairs between median tuft and apex on posterior surface. Pecten variable, in some specimens an irregular group of small transparent fringed teeth towards base, and a widely spaced row of 4 or 5 larger teeth, also minutely fringed, on rather more than basal ½ of tube; in other specimens the smaller teeth towards base appear to be absent. *Anal segment* enclosed in a chitinous ring, *isc* of 6 or 7 branches, *osc* single, *lh* with one very long branch and one much finer and shorter, a patch of spines on margin of ring on each side, a pair of fine single ventral hairs in place of fan or brush, one or both occasionally split into two. Both pairs of anal papillæ very long, about twice length of anal segment and nearly as long as siphon-tube, moderately wide, tips rounded.

HABITAT.—Water in leaf-bases of a large *Arum* (*Barraud*).

DISTRIBUTION.—BIHAR: Pusa*, 2. xii. 1926 (*Mathur*); CHITTAGONG HILL TRACTS: Rangamatti*, ix. 1922 (*Barraud*); New Forest*, Dehra Dun, U.P., 10. iv. 1930 (*Mathur*). BURMA: Rangoon*, 13. xi. 1930 (*Feegrade*). CALCUTTA*: North-West Soap Co.'s Factory, Matiabruz, near west end of King George's Dock, 25. v. 1931 (*Senior-White*). ASSAM: Golaghat*, Sibsagar dist., 14. x. 1924, i. & xi. 1925 (*Barraud*). CEYLON: Colombo*, x. 1913 (*James*).

Only known with certainty elsewhere from MALAY PENINSULA.

15. **Harpagomyia jacobsoni** Edwards, 1930.

Bull. Ent. Res. xxi, p. 543 (♀). TYPE-LOC.: Fort de Kock, Sumatra, 1926 (*E. Jacobson*). TYPE: ♀ in Brit. Mus.

ADULT.—Resembles *H. genurostris*, but differs as follows:—Larger and darker, wing 3–3·5 mm.; clypeus dark, both this and tori with pale pruinescence, no scaled line between eyes, scales on front of vertex and on *apn* definitely blue or bluish-violet, not silvery-white with bluish sheen,

integument of mesonotum and of pleuræ black, swollen apical part of proboscis entirely dark in both sexes, lateral silvery patch on abdominal tergite IV smaller.

PUPA and EGG.—Unknown.

LARVA.—Differs from *H. genurostris* as follows:—The five pairs of frontal hairs have much the same arrangement, but are all single and somewhat thicker; comb of about 16–20 teeth arranged more or less in two rows; anal papillæ more pointed; ventral hair of anal segment with 3 fairly long branches. In other details the resemblance to larva of *H. genurostris* is very close.

HABITAT.—Water in leaf-bases of a large species of *Arum*, in association with *H. genurostris* (*Barraud*).

DISTRIBUTION.—CHITTAGONG HILL TRACTS: Rangamatti*, ix. 1922 (♀) (*Barraud*). DARJEELING DIST., Marianbarrie Tea Estate*, near Sukna, viii. 1928 (♀) (*Sobha Ram*); Rangamatti*, Jalpaiguri dist., 10. xi. 1929 (♂) (*Sinton*).

Originally recorded from SUMATRA; not known from elsewhere.

Genus **HODGESIA** Theobald, 1904.

Journ. Trop. Med. vii, p. 17. Genotype, *H. sanguinæ* Theo.

ADULT †.—Very small mosquitoes, distinguished from all other Culicini by the form of the outstanding scales on the outer ½ of the wing; these scales (fig. 13, **c**) are narrow and emarginate at their tips, and appear as though the sides were prolonged into minute spines beyond the end of the scale. As in *Harpagomyia* and *Uranotænia*, vein 6 is short and ends at about level of fork of 5 and base of 2 (fig. 13, **a**), a line drawn through these points forming a right-angle with the costa; *af* about length of its stem; squama quite bare (fig. 13, **b**). Proboscis normal, not swollen at tip, and about length of abdomen; palpi very short in both sexes; antennæ alike in both sexes, not plumose, all flagellar segments subequal in length. Pleural bristles much reduced, no spiracular, postspiracular, or prealar, one strong lower mesepimeral bristle and one or two upper, two strong posterior pronotal, one sternopleural, or this may be absent. Postnotum without setæ. Tarsal claws simple. Coxite of ♂ hypopygium short and without lobes, style without distinct appendage, phallosome simple, paraprocts strongly developed, with 5 or 6 strong teeth at crown; cerci of ♀ small, usually hidden, only one chitinised spermatheca.

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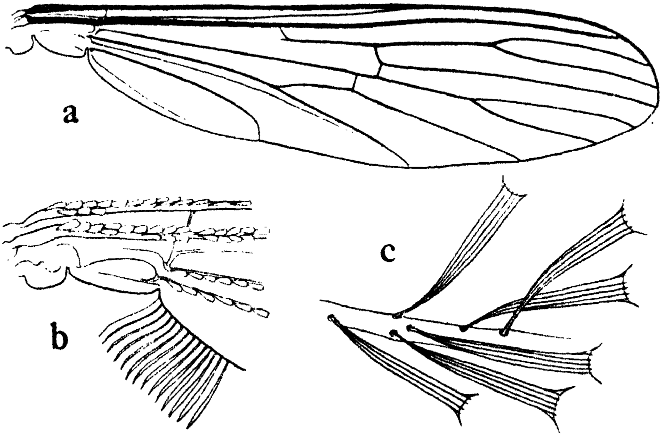
† Theobald 1907, p. 579; Leicester 1908, p. 229; Barraud 1929 *a*, p. 1061; Edwards 1930 *a*, p. 299; 1932, p. 93.

PUPA *.—Those of Indian species are unknown; the pupæ of two African species have been collected and show the following characters:—Respiratory trumpets (fig. 14, **a**) cleft almost to base into two leaflets of unequal widths, the narrower one notched at tip; abdomen with conspicuous dark pattern, VII and VIII without lateral tufts; paddles notched at tip, serrate round apical margin, about equally divided by strong midrib, at tip of which is one hair.

LARVA * (fig. 14).—The chief points of structure are given below in the description of that stage of *H. malayi*.

BIONOMICS.—Nothing is known regarding the habits of the two species occurring in the Indian area. Larvæ have been found in small pools in swampy ground and in pools in jungle *.

Fig. 13.



Hodgesia malayi: **a**, wing, showing venation; **b**, base of wing, showing bare squama; **c**, scales from lower fork.

DISTRIBUTION.—Five species are known from the Oriental and Australasian regions, of which one occurs in S. India and one in Ceylon. Four other species are known from Tropical Africa.

Key to Adults.

Integument of mesonotum and of pleuræ uniformly reddish-brown or ferruginous	*malayi*, p. 54.
Integument of mesonotum pale yellowish, with a large brownish-black oval area over, and in front of, each wing-base; sternopleura and lower part of mesepimeron black, pleuræ otherwise yellowish	*bailyi*, p. 55.

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* **Wigglesworth 1929, pp. 60–62; Edwards 1932, p. 93.**

16. **Hodgesia malayi** Leicester, 1908.

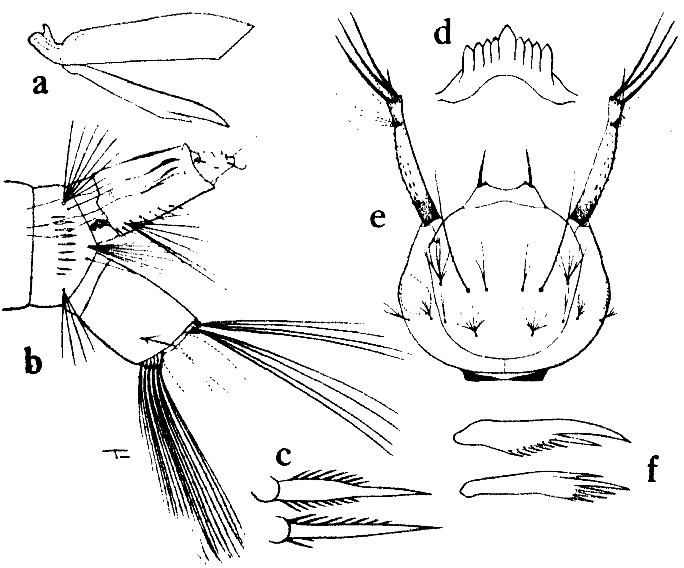
Cul. Malaya, p. 231 (♂ & ♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.

Hodgesia ampyx Dyar, 1920, Insec. Insc. Mens. viii, p. 176 (♀). TYPE-LOC. : Philippine Is. TYPE : two co-type ♀♀ in U.S. Nat. Mus.

ADULT *.—Small species with unmarked abdomen †. Wing 2–2·5 mm. (fig. 13).

♀.—*Head* : flat-scaled, scales along eye-margins and on vertex white, on nape dark brown ; torus and flagellum light brown, hairs dark ; clypeus reddish-brown ; palpi and proboscis dark brown, palpi very short. *Thorax* : integument of mesonotum reddish-brown clad with bronzy-brown narrow scales and dark brown bristles, scutellar scales brown ; integument of pleuræ reddish-brown, with several patches of silvery-white scales, similar scales on *apn*. *Wings* : venation and

Fig. 14.



odgesia, pupal and larval characters : **a**, respiratory horn of pupa, *H. nigeriæ* ; **b**–**f**, *H. malayi*, larval details ; **c**, pecten-teeth ; **f**, comb-teeth. (N.B.—The row of fine ventral hairs on the anal segment is accidentally omitted in fig. **b**.)

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* Dyar & Shannon 1925, p. 70 (syn.) ; Edwards 1930 *a*, p. 299.

† [The other Oriental species, *quasisanguinea* Leic., has silvery markings on abdomen.]

scales typical. *Legs*: dark brown, femora conspicuously lighter. *Abdomen*: dark brown, without bands or spots.

♂.—Resembles ♀ very closely.

PUPA and EGG.—Unknown.

LARVA* (fig. 14).—Preclypeal spines moderately long and stout, the five pairs of frontal hairs all placed rather far back, *A* with about 6 short branches, *B* single and long, *C* placed almost directly behind *B*, with about 8 short branches, *d* internal and slightly anterior to *B*, with 3 fairly strong branches, *e* external and slightly anterior to *C*, with 2 or 3 fine branches. Mouth-brushes relatively large. *Antenna* of moderate length, slightly curved, shaft with small spines and 4 bristles very near tip (3 long and 1 short), the longer bristles with numerous short spines, tuft at ⅚ of length from base. *Mentum* rectangular, with 4 teeth on either side of large median tooth. *Thorax* with relatively large tufts of slightly plumose hairs. *Comb* of about 7 teeth arranged in a row, teeth pointed, with delicate lateral fringes. *Siphon* short and cylindrical, about same length as anal segment, valves comparatively large, pecten of about 6 stout spines, without lateral denticles, along about basal ½ of tube, tuft arises very near base of tube, divided into about 8 rather stout branches, of equal length with siphon. Anal segment completely enclosed in chitinous ring, both *isc* and *osc* divided into a number of branches, *lh* of 2 or 3 stout branches, one at least of which is spinous; a row of several fine hairs along ventral surface of segment (omitted in figure), as well as a fairly well-developed fan or brush, latter of about 6 fairly long-branched hairs, no fan-plate.

HABITAT.—Jungle-pools (*Leicester*).

DISTRIBUTION.—CEYLON: Colombo, 1913 (*James*).

Not known in India, but occurs in MALAY PENINSULA and PHILIPPINE ISLANDS.

17. **Hodgesia bailyi** Barraud, 1929.

Ind. Journ. Med. Res. xvi, p. 1062 (♀). TYPE-LOC.: Virajpet, Coorg, South India, vi. 1927 (*J. D. Baily*). TYPE: ♀ in Brit. Mus.

ADULT.—Wing 2·5 mm.

♀.—*Head*: flat-scaled; a broad band of silvery scales along eye-margins, widest in middle, where it occupies about ½ the dorsal surface; behind the straight posterior margin of this band there are black scales continued to nape. Tori brown, flagellar segments and hairs of antenna dark brown; clypeus dark brown; palpi and proboscis brownish-black,

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* Wigglesworth 1929, p. 63.

the former minute. *Thorax*: integument of mesonotum area pale yellowish on anterior ½, a large oval brownish-black over and in front of each wing-base, scutellum and a small space on mesonotum in front of it yellowish, a sparse covering of black hair-like scales and dark bristles on mesonotum; postnotum dark brown; *ppn*, postspiracular area, upper part of mesepimeron, and coxæ yellowish, sternopleuræ and lower part of mesepimeron black; upper part of dark area overlaid with patches of flat silvery scales, similar scales on *apn*, two black *ppn* bristles. *Wings*: scales and venation typical. *Legs*: tibiæ and tarsi dark brown, with bronzy metallic sheen, fore femora light on about basal ½, otherwise dark brown, mid-pair dark brown anteriorly, pale posteriorly and ventrally for whole length, hind pair nearly all white, except for a short dorsal brown streak to the knee. *Abdomen*: entirely bluish-black, with metallic lustre, blunt at extremity owing to retraction of terminal segments, cerci very small and completely hidden; one chitinised spermatheca.

♂ and early stages unknown.

HABITAT.—Small pool in swampy area (*J. D. Baily*).

DISTRIBUTION.—Known only from type-locality.

Genus **URANOTÆNIA** Lynch Arribalzaga, 1891.

Rev. Mus. La Plata, i, p. 375. Genotype, *U. pulcherrima* L. Arrib.

Anisocheleomyia Theobald, 1905, Entomologist, xxxviii, p. 52. Genotype, *A. nivipes* Theo.

ADULT*.—Small mosquitoes, distinguished from all other Culicinæ by form of microtrichia on wing-membrane; these are very much smaller and denser than in any other genus, requiring a magnification of more than 80 for their detection; at this magnification the membrane appears clear; vein 6 short (fig. 15) and curved down to wing-margin at tip, this point being usually nearer base of wing than level of commencement of 2 and fork of 5; *af* usually very short, always much shorter than its stem; squama without hairs. *Palpi* in both sexes quite short. *Proboscis* often slightly enlarged at tip, especially in ♂, and about length of abdomen, except where otherwise mentioned in descriptions. *Antennæ*: usually a little longer than proboscis in ♀, segments subequal in length and setose, about length of proboscis in ♂, plumose, last two segments elongate. *Eyes*: touching above antennæ and below

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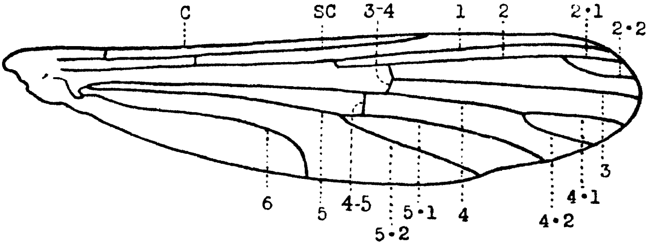
* Theobald 1901, p. 241; Leicester 1908, p. 203; Edwards 1912 *a*, p. 37; 1921 *c*, p. 282; 1932, p. 96; Howard, Dyar, & Knab 1917, p. 898; Kirkpatrick 1925, p. 67; Barraud 1926, p. 331; Barraud & Covell 1928, p. 676 (buccal cavity); Martini 1930, p. 196.

proboscis. Orbital bristles not numerous, but the row not conspicuously interrupted. Vertex and nape covered with broad, flat, and upright scales, the latter variable in number, in some species few and confined to nape, in others more numerous and extending forwards nearly to eye-margins. Dorsum of *thorax* clothed with narrow scales and bristles, in some species there are flat scales along lateral margin in front of wing-root, or pale narrow scales in this position, which may or may not form a continuous border round the front margin ; the presence or absence of such scales is of importance in identification. *apn* widely separated, with usually only 3 bristles, usually only 1 *ppn* bristle, 1 spiracular (absent in some species, as mentioned in descriptions[*]), no postspiracular, about 2 prealar, several upper sternopleural, 1 or 2 upper and 1 lower mesepimeral. Upper margin of meron well above base of hind coxa. Postnotum bare. Scutellum, in all Indian species, covered with flat dark brown scales, at least on the mid-lobe. All tarsal claws of both sexes simple, those of fore and hind legs in both sexes (except claws of fore leg of ♂ of *U. unguiculata*) short and equal, but one sometimes broader than the other, claws of mid-leg of ♀ equal, of ♂ unequal (in *U. edwardsi* ♂ both are very long and equal). No pulvilli. In several species the tarsi of one or more pairs of legs are specialized in the ♂ (fig. 17), whilst in others the comparative length of tibia and of segment 1 of tarsi of fore and hind legs form easily seen distinctions. *Hypopygium* of ♂[†] (fig. 18) with coxite short and broad, with lobe on inner side bearing several long thick bristles ; style of varying length in different

Fig. 15.



Wing-venation of *Uranotænia*, showing notation used in this volume. (Note shortness of vein 6 in this genus.)

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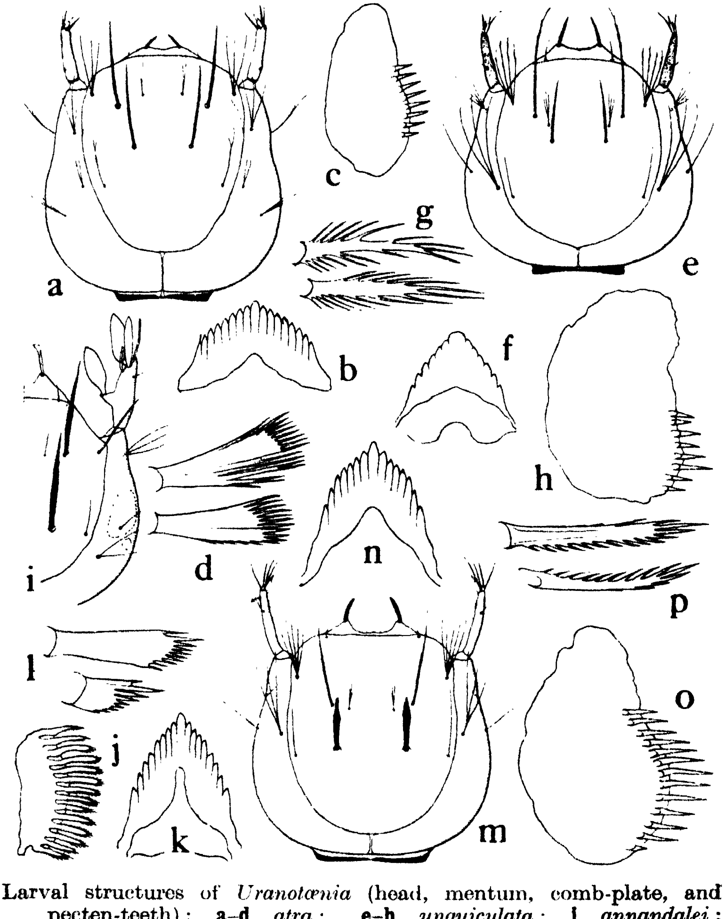
[*] This character may be variable; only a few specimens of each species have been available for examination.

[†] Macfie & Ingram 1922, p. 184 ; Christophers 1922, p. 566 ; Kirkpatrick 1925, p. 69 ; Barraud 1926, p. 331 ; Martini 1930, p. 196 ; Edwards 1932, p. 196.

species, with terminal appendage usually quite small, phallosome divided into lateral plates bearing a few teeth; anal segment membranous, without distinct paraprocts. Only one chitinised spermatheca in ♀, as in *Hodgesia* and *Ficalbia*.

Fig. 16.



Larval structures of *Uranotænia* (head, mentum, comb-plate, and pecten-teeth): **a–d**, *atra*; **e–h**, *unguiculata*; **i**, *annandalei*; **j–l**, *recondita*; **m–p**, *maxima*.

PUPA *.—Among Indian species only that of *U. unguiculata* is known; a short description is given under that species. In this, and in the majority of pupæ described from other regions, the respiratory trumpet is rather short, with small opening, paddle without distinct fringe, though apical margin may be serrated, part of paddle inside midrib wider than that outside, one small terminal hair.

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* Edwards 1932, p. 96. See also under *unguiculata* and other species.

LARVA, 4th stage[*] (fig. 16).—The larvæ of only eight or nine Indian species are known; these show fairly well-marked generic characteristics—head small, antenna short, preclypeal spines usually stout and short, arising from projections of preclypeus. In many species one or more pairs of frontal hairs are stout, in some cases resembling flattened leaf-like bristles. Lateral hairs on thorax and on segments I and II of abdomen fairly well developed. Abdominal segment VIII bears a comb on each side, the teeth usually arising in a row along the posterior margin of a chitinised plate. Siphon with one pair of hair-tufts at about middle; acus well developed; pecten present, the teeth of characteristic form, usually scale-like, wide at tip, with lateral and terminal delicate fringes. Anal segment enclosed in a chitinous ring, the hind margin spinose; both pairs of subdorsal hairs of 2 or more branches; anal fan small.

EGG.—The eggs are laid in boat-shaped masses. Those of Indian species are unknown.

BIONOMICS[*].—Little is known of the habits of the adults; they do not appear to attack man to any extent. The larvæ of some species live in stream-pools and swamps, whilst those of several others have been taken from tree-holes, bamboos, and pitcher-plants. From their habit of resting almost horizontally in the water just below the surface they may usually be distinguished from other Culicine larvæ, but may be mistaken for those of *Anopheles*.

DISTRIBUTION.—Members of the genus are found in most parts of the Indian area, but are most abundant in the regions of heavy rainfall. Numerous species are known from the tropical and subtropical regions of both the New and Old Worlds.

Key to Adults.

1.	Hind tarsi with white markings, or pale at tip	2.
	Hind tarsi entirely dark	6.
2.	No white scales on wings; hind tarsi pale at tip only (segments 4–5 and distal part of 3)	*testacea*, p. 74.
	Some white scales on wings; segments 2–4 of hind tarsi with pale markings (5 or 4–5 all pale)	3.
3.	Costa of wing with pale areas	4.
	Costa entirely dark; proboscis dark; segments 1–3 of hind tarsi with basal and apical white rings....................	5.

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[*] Senior-White 1920, p. 319; Edwards 1932, p. 97.

4.	Proboscis mainly white above; segments 1–3 of hind tarsi with *apical* white rings only (4–5 white)	*alboannulata*, p. 62.
	Proboscis dark: segment 1 of hind tarsi all dark, 2–4 with *basal* white marks only	*edwardsi*, p. 65.
5.	Hind tibiæ with 3 white patches, femora without white knee-spots	*rutherfordi*, p. 63.
	Hind tibiæ with an apical white ring only, a white knee-spot on each femur	*christophersi*, p. 64.
6.	Some white, blue, or creamy flat broad scales along lateral margin of mesonotum in front of wing-root	7.
	No pale or blue *broad* flat scales along margin of mesonotum (though there may be *narrow* pale scales in this position)	13.
7.	A border of flat creamy scales along lateral margin of mesonotum from wing-root, continued round front; wings mainly pale scaled	*orientalis*, p. 66.
	A line of white or blue flat scales not forming a complete border round front of thorax; wings mainly or entirely dark scaled	8.
8.	Flat scales along lateral margin of mesonotum not continued anteriorly beyond *ppn*; mid-femur without a pale longitudinal line	9.
	Flat scales continued nearly to neck; a pale line along basal ⅔ of anterior surface of mid-femur	*unguiculata*, p. 67.
9.	Proboscis longer than whole body; abdomen black, with large lateral apical white patches (which may unite on dorsum) on segment IV only	*longirostris*, p. 71.
	Proboscis of moderate length; abdomen with either pale lateral patches, or median pale markings dorsally, on more than 3 segments	10.
10.	Lateral apical markings on abdominal tergites, no median pale markings on dorsum; fore tarsi of ♂ peculiar (fig. 17, **a**).	*atra*, p. 72.
	Median pale markings on I–IV, V with complete apical white band; fore tarsi of ♂ normal	11.
11.	Dorsum of mesonotum covered with a mixture of pale brown, ochreous, and dark brown scales	*macfarlanei*, p. 70.
	Dorsum of mesonotum covered with deep brown scales only	12.
12.	Tergites II–IV with lateral pale spots separate from the median pale apical markings	*campestris* var. *zelena*, [p. 69.
	Tergites II–IV without separate lateral pale spots	*campestris* (type-form), [p. 68.
13.	A line of bluish-white scales across pleuræ, a patch of rather broad greyish-brown scales over wing-root	*annandalei*, p. 75.
	No line of bluish-white scales across pleuræ, no patch of greyish-brown scales over wing-root	14.

14.	Abdomen banded	15.
	Abdomen unbanded	18.
15.	Bands well defined on all segments, no border of pale narrow scales round margin of mesonotum	16.
	Bands faintly indicated, but usually definite on one or more terminal segments; a border of pale narrow scales from wing-roots round front of mesonotum	*maxima*, p. 77.
16.	Pleuræ uniformly pale	*luteola*, p. 80.
	Pleuræ with dark patches	17.
17.	Pleuræ pale yellow, with conspicuous brownish-black markings; mesonotum dark brown, with scales of same colour, except at sides in front, where they are lighter	*stricklandi*, p. 80.
	Pleuræ dark brown, with slightly paler and darker areas; mesonotum brown, covered with pale ochreous scales	*bicolor*, p. 83.
18.	Some narrow pale scales on front or lateral margins of mesonotum	18.
	No pale scales on front or lateral margins of mesonotum	22.
19.	A large velvety black spot in front of each wing-root	*bimaculata*, p. 78.
	No large black spot in front of wing-root	20.
20.	Pale scales on front and lateral margins of mesonotum forming an almost continuous border from wing-root round front margin; mesonotal bristles rather long, curved, and conspicuous	21.
	Pale lanceolate scales on margin of mesonotum for short distance in front of wing-root only, none on front margin; mesonotal bristles rather short and inconspicuous	*hebes*, p. 81.
21.	Pleuræ uniformly pale	*nivipleura*, p. 76.
	Pleuræ with a dark band across the middle, lower ½ of mesepimeron dark	*maxima*, p. 77.
22.	Pleuræ with conspicuous dark markings on a pale ground	*maculipleura*, p. 82.
	Pleuræ uniform in colour	23.
23.	Mesonotal bristles long, curved, and dense, pleuræ pale brown, dorsum of abdomen brown, venter paler	*recondita*, p. 83.
	Mesonotal bristles neither long nor dense, pleuræ rather dark brown, dorsum and venter of abdomen dark brown	*novobscura*, p. 84.

Key to known Larvæ (4th stage).

1.	Comb-teeth with fringed rounded ends	*recondita*.
	Comb-teeth ending in a single sharp point	2.
2.	Numerous strong stellate hairs on thorax and abdomen, the tips of branches stout and ending in several minute sharp points	*maxima*.
	Hairs on thorax and abdomen not so	3.
3.	Pecten of 17–20 teeth	4.
	Pecten of 9–14 teeth	5.

4. Antennal hair single, at about middle of shaft. Comb of 8–9 teeth, of which lateral are smaller than median. Siphonal tuft of about 8 branches ; *lh* 4-branched.................. *unguiculata.*
Antennal hair with several fine branches, at about ⅗ length of shaft from base. Comb of 7 fairly large subequal teeth. Siphonal tuft 3-branched ; *lh* 2-branched............. *novobscura.*
5. Frontal hairs *B* and *C* very stout, resembling flattened leaf-like bristles.................. 6.
Frontal hairs *B* and *C* less stout, not flattened, resembling finely barbed bristles .... *atra.*
6. Antenna with three large, leaf-like appendages. Plates of VIII connected dorsally .... *annandalei.*
Antenna normal. Plates of VIII separate..... 7.
7. Pecten of about 14 teeth. Frontal hair *B* posterior to *A* .... *macfarlanei**.
Pecten of about 11 teeth. Frontal hair *B* in transverse line with *A* .... [*campestris* *. (*longirostris* ?);

18. **Uranotænia alboannulata** (Theobald), 1905.

Anisocheleomyia alboannulata Theo., Entom. xxxviii, p. 54 (♂, fig. ungues fore leg). TYPE-LOC. : India (*James*) (probably Travancore). TYPE : ♂ in Brit. Mus.

ADULT †.—A rather small blackish species, highly ornamented with white or bluish-white scales on proboscis, head, body, and legs ; quite distinct from any other in India. Wing about 2·2 mm. ‡.

♀.—*Head* : a narrow border of bluish-white scales to eyes, widest at sides, some very long white scales projecting between eyes in front, a small patch of pale scales in middle of vertex towards nape, brownish-black scales over remainder of vertex, some dark upright scales towards nape ; palpi a little longer than clypeus ; upper side of proboscis white scaled, except for a dark interruption near middle and a dark tip, underside mainly dark. *Thorax* : integument of mesonotum black, clothed with dark brown narrow scales, with a narrow, sharply-defined border of bluish-white flat scales from wing-roots all round margin ; a line of bluish flat scales across pleuræ, continuous from head to base of abdomen, including *apn*,

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* The key is based on scanty material, and in some cases it has been necessary to rely on descriptions and drawings by other writers. In Senior-White's figure of the larva of *campestris* and in Brug's figure of the larva of *macfarlanei* no lateral plate on VIII is shown, but these may have been omitted from the drawings. Of *longirostris* only a third-stage larva has been examined.

† Theobald 1907, p. 573 ; Edwards 1913 *b*, p. 238, and 1922 *b*, p. 91 (syn.) ; Barraud 1926, p. 334.

‡ A Malayan species (*U. trilineata* Leic.) is very similar, but differs in having a white ring in middle of segment 1 of hind tarsi.

sternopleura, and mesepimeron, another line of similar scales immediately above coxæ, integument of pleuræ almost black. *Wings*: a rather large patch of white scales anteriorly in middle of wing from costa to cross-veins, another patch at tip of wing, including costa, fork-veins, and apical third of 3, some white scales at base of wing on 1, 4, 5, and 6. *Legs*: femora dark brown with a line of white scales from base extending nearly whole length of each, a white knee-spot and a dark interruption between this and end of white line, on fore and mid-femora the line is along dorsal edge on anterior surface, and on fore femur there is a white spot between end of line and knee-spot, a white line on posterior surface of mid-femur, a short white line on apical half of posterior surface of hind femur, tibiæ of fore and mid-legs dark, lighter at tips of tibiæ, three wide white markings on hind tibia not forming complete rings beneath, one at apex, one in middle, and one near base, the actual base being brown, as are also the spaces between the white markings and underside, tarsi of fore and mid-legs brown, appearing very pale in certain positions, segments 1 and 2 of hind tarsi with rather wide apical white rings, the tip of 3 and whole of 4 and 5 white. *Abdomen*: bluish-white scales covering tergite I and base of II, pale scales continued as a median longitudinal band on II, III, and IV, widening out into an apical band on IV, a pale apical band on VI, very small pale lateral patches on V and VII, remainder brownish-black, venter dark brown.

♂.—Very similar to ♀, wing about 1·8 mm., antennæ plumose and about length of proboscis, palpi as in ♀. *Hypopygium*: style short and wide (fig. 18, **a**).

LARVA and PUPA.—Unknown.

DISTRIBUTION.—S. INDIA: Malabar Coast *, x. 1915 (*Khazan Chand*); Karwar, N. Kanara dist., 1901–5 (*Cogill*); Mudigere, Mysore *, 1931 (*Anantaswami Rao*); Travancore (?) (*James*). Not recorded from elsewhere.

19. **Uranotænia rutherfordi** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 288 (♀). TYPE-LOC.: Peradeniya, Ceylon, 30. iv. 1914 (*A. Rutherford*). TYPE: ♀ in Brit. Mus.

ADULT †.—Resembles *U. alboannulata*, but differs as follows:—Proboscis entirely dark, femora without white knee-spots, the mid as well as the fore pair with a white spot between the end of the longitudinal line and knee, the first of the three white markings on hind tibia situated at base, and not slightly removed from it, segments 1 to 3 of hind tarsi narrowly white at both base and tip, costa of wing entirely dark.

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† See also Barraud 1926, p. 335.

♂ and early stages unknown.

DISTRIBUTION.—Known only from the type-locality.

20. **Uranotænia christophersi** Barraud, 1926.

Ind. Journ. Med. Res. xiv, p. 336 (♂ & ♀, ♂ hypop. fig.). TYPE-LOC.: Andaman Is., ix. 1911 (*Christophers*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Diagnostic points are given in key. The ♂ may be recognized by modifications of tarsi. Wing about 2 mm.

♀.—*Head*: a line of bluish-white flat scales on sides from near *apn*, continued forward to eye-margins in middle, some long white scales projecting forward between eyes, brownish-black flat scales and a few black upright scales covering remainder of upper surface, a patch of brownish-black flat scales low down at each side; palpi scarcely exceeding clypeus in length; proboscis and antennæ dark brown. *Thorax*: mesonotum dark brown, covered with dark brown scales, a moderate number of dark bristles, a thin line of broad white flat scales along margin from wing-root to *ppn*; integument of pleuræ dark, broad white scales on *apn* continued as a line across pleuræ to mesepimeron, small patches of similar scales on coxæ. *Wings*: white scales along basal ½ of stem of vein 5 and at extreme base of 4, cross-veins light in colour, otherwise wing is dark. *Legs*: brown, with pale markings, pale knee-spots on femora, most pronounced on hind legs, a short line of pale scaling on anterior surface of mid-femur at base, a thin white line dorsally on anterior surface of hind pair, pale markings at tips of tibiæ of fore and mid-legs, a pale apical ring on hind tibia continued over the joint between this and segment 1 of hind tarsi, similar apical and basal rings over the joints between segments of hind tarsi, segment 5 being entirely pale, tarsi of fore and mid-legs brown. *Abdomen*: lateral apical white patches on tergites, median apical white patches on I–III, a wide apical white band on V, no apical white bands or median patches on IV, VI, or VII.

♂.—Markings as in ♀, segment 1 of hind tarsi (fig. 17, **d**) unusually short, with a double row of stiff curved hairs beneath, segment 1 of fore tarsi ⅘ length of tibia. *Hypopygium*: style (fig. 18, **c**) very similar to that of *U. alboannulata*.

LARVA and PUPA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

21. **Uranotænia edwardsi** Barraud, 1926 *.

Ind. Journ. Med. Res. xiv, p. 337 (♀). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, 23. ix. 1924, caught in bungalow (♀) (*Barraud*); Gauhati, Kamrup dist., Assam, 31. x. 1926 (♂) (*Barraud*). TYPE: ♀ and allotype ♂ in Brit. Mus.

ADULT.—A small, dark mosquito, with mainly white-scaled wings, lines of bluish-white scales in front of wing-root and across pleuræ; fairly easily recognized by diagnostic points given in key. The ♂ has remarkable proboscis and mid-tarsi (fig. 17, e, f). Wing about 2 mm.

♀.—*Head*: vertex covered with flat bluish-white scales, some long white scales projecting forward between eyes, scales towards nape brownish, very few upright scales, a patch of dark brown scales low down at each side; palpi projecting very slightly in front of clypeus, covered with dark scales and hairs; proboscis dark scaled, a little longer than abdomen, slightly enlarged at tip, approximate length 1·5 mm. *Thorax*: mesonotum dark brown, covered with dark brown narrow scales and fairly numerous long black bristles, a line of bluish-white flat scales from wing-root to *ppn*; postnotum brownish-black; pleuræ almost black on upper part, lighter towards coxæ, a line of bluish-white flat scales from *apn* across pleuræ to mesepimeron, no spiracular bristle. *Wings*: spotted, white scales at tip of wing including costa, fork-veins, and apical part of 3, a narrower white area in middle of wing, including costa and vein 1, spreading posteriorly on to cross-veins, base of 5.1, and whole of 5.2, further white scaling at base of wing on costa, a small area on 1 removed from base, on base of 4, on more than basal ½ of 5, and less than basal ½ of 6, remaining wing-scales brownish-black. *Legs*: fore and mid-pairs dark brown, undersides of femora paler, an indistinct pale marking at tip of hind tibia on underside, segment 1 of hind tarsi dark brown, indistinct pale markings at bases of 2, 3, and 4, chiefly on underside, 5 entirely pale; segment 1 on fore and hind legs shorter than tibia. *Abdomen*: dorsum dark brown, venter paler, indistinct apical pale markings on tergites III and IV.

♂.—Markings as in ♀, proboscis longer, about 1·9 mm., apical ⅓ with a number of long hairs projecting from upper

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* [This is probably only a variety of the Malayan *U. micans* Leic., which is similarly adorned and has the same structure of proboscis and middle tarsi in ♂, differing chiefly in having broad and complete white rings at bases of segments 2–4 of hind tarsi. Other Oriental (Malayan) species which are somewhat similar are: (1) *nivipes* Theo., with a broad band of flat white scales all round margin of mesonotum, hind tarsi broadly white-tipped; (2) *unimaculiala* Leic., proboscis unusually long, tarsi dark; (3) *bimaculiala* Leic., scales at base of wing dark.]

side and slightly curved downwards (fig. 17, f); tarsi of mid-leg specialized, segment 1 about ⅓ length of tibia and slightly shorter than 2, 4 rather shorter than 5, with several strong spines at its tip, 5 with a pair of very large simple claws apparently articulated at about middle of segment and not at tip (fig. 17, e). *Hypopygium*: style comparatively short and very wide, widest at about ⅔ length from base and tapering sharply from this point to tip.

Early stages unknown.

DISTRIBUTION.—Known only from type-localities.

22. **Uranotænia orientalis** Barraud, 1926.

Ind. Journ. Med. Res. xiv, p. 339 (♂, hypop. fig.). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, i. 1925, caught in jungle (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT.—Distinct on account of the general pale colour, mainly pale wings, and unbanded legs*. Wing 1·5 mm.

♂.—*Head*: creamy or pale brown flat scales on vertex, a few upright scales towards nape, a small patch of dark brown flat scales low down at each side; palpi scarcely longer than clypeus; proboscis dark brown, about length of abdomen, approximate length 1·4 mm.; antennæ slightly shorter than proboscis, plumes brown. *Thorax*: dark brown narrow scales covering mesonotum, except for a band of flat creamy scales from wing-roots round front margin forming a continuous and rather broad pale border, bristles on dorsum black, not unusually long nor numerous, scutellar scales brownish-black, postnotum dark brown; integument of pleuræ very pale brownish, some creamy flat scales on *apn* and *ppn*; other details of pleural scaling cannot be given, as the only known specimen is pinned through this area. *Wings*: mainly pale scaled, costa dark brown, except at tip of wing, subcosta dark scaled, except at base, some dark scaling along middle part of veins 1 and 2; otherwise wing-scaling is almost entirely pale. *Legs*: brown, without paler markings, uniformly yellowish when seen in certain positions, segments 1 and 2 of fore tarsi together equal in length to tibia, segment 1 of hind tarsi shorter than tibia. *Abdomen*: creamy scales covering tergite I, pale scaling on II, except for a small dark brown patch on each side at base, dark brown beneath, III with apical pale band, IV nearly all pale, with a few dark scales at base dorsally, V–VII dark brown, except for an apical median pale patch dorsally. *Hypopygium*: style (fig. 18, f) short and widened near tip, resembling that of *U. atra*.

♀ and early stages unknown.

DISTRIBUTION.—Known only from type-locality.

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* [All the other Oriental species with pale wing-tip have the pleuræ at least partly dark and abdomen more extensively dark.]

23. Uranotænia unguiculata Edwards, 1913.

Journ. & Proc. Asiatic Soc. of Bengal (n.s.), ix, p. 51 (♂). TYPE-LOC.: Tiberias, Palestine, x. 1912 (*N. Annandale*). TYPE: ♂ in Ind. Mus.

ADULT *.—A fairly large and robust species of general dark colour and distinctive ornamentation of bluish-white scales. Wing 2·5–3 mm.

♀.—*Head*: vertex and nape covered with brownish-black flat scales and numerous dark upright scales, usually a small number of pale scales in middle of vertex towards nape, a thin line of bluish-white scales to eye-margins widening out slightly at sides; conspicuous white scaling on inner sides of tori; antennæ, clypeus, palpi, and proboscis dark brown, the last paler beneath, palpi exceeding clypeus by about its length. *Thorax*: integument of mesonotum dark brown or black, covered with dark brown narrow scales and dark bristles, a line of bluish-white flat scales along lateral margin from wing-root nearly to neck, not forming a complete border round front margin; integument of pleuræ brownish-black, lighter towards coxæ, some black lanceolate scales on *ppn*, flat white scales on *apn* continued as an irregular line across pleuræ on to mesepimeron. *Wings*: dark scaled, except for a short line of white scales at base of vein 1, fork-cells rather longer than usual. *Legs*: very small pale knee-spots to femora, fore pair dark brown anteriorly, paler posteriorly, a pale longitudinal line along basal $\frac{2}{3}$ of anterior surface of mid-pair, posterior surface pale, except along dorsal edge, hind femur pale along both surfaces for nearly whole length, except along dorsal edge, tibiæ of fore and mid-legs brown, faintly pale at tips, hind tibia brown, with conspicuous white mark at apex and with a short white line dorso-anteriorly at about middle, tarsi of all legs brown. *Abdomen*: tergites dark brown, with basal dull white or creamy lateral patches, sometimes indications of narrow basal pale ochreous bands on dorsum, venter pale brown.

♂.—Claws of fore leg unequal, segment 1 of hind tarsi shorter than tibia, palpi only very slightly longer than clypeus. antennæ plumose; lateral pale markings on tergites are not so well developed as in ♀, and may be absent, VIII pale scaled dorsally (after rotation). *Hypopygium*: style (fig. 18, **d**) moderately long and comparatively wide for whole length, slightly curved.

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* Waterston 1918, p. 11; Edwards 1921 *c*, p. 283; Kirkpatrick 1925, p. 68; Barraud 1926, p. 338; Martini 1930, p. 196.

PUPA†.—Respiratory trumpet about 4 times length of width, with transverse folds near base; abd. seg. I with dendritic tuft, lateral hair on IV–VI fairly long, with 5–6 branches, on VII quite small, on VIII long, with about 8 branches, two or three of the sublateral and submedian hairs on IV–VII well developed, with 3–9 branches; paddle with part inside midrib wider than that outside, outer and apical margins serrate, terminal hair single and short.

LARVA † (fig. 16, **e–h**).—Head and antenna dark brown or black; antenna short, with a few minute spicules, a single hair at about middle; preclypeal spines fairly long; median hairs of mouth-brush hooked and minutely serrate apically; frontal hairs as in fig. 16, **e**; *B* and *C* fairly strong. Hairs on thorax fairly well developed, lateral series branched, lateral hairs on abdominal segments I and II fairly stout and long, those on remaining segments rather small, many with a number of branches, comb-plates (fig. 18, **g**) with 8 or 9 teeth along posterior margin, upper and lower teeth smaller than median. Siphon from 0·7–0·85 mm. long, 3 or 4 times length of width at base, pecten of about 19 teeth, of usual form, tuft of about 8 branches, its base opposite the most distal pecten-tooth; *osc* 2-branched, *isc* 3- or 4-branched, *lh* of 4 rather long branches, both pairs of anal papillæ short, tips pointed, fan of about 10 fairly long branched hairs arising from rudimentary fan-plate.

HABITAT.—Reedy and weedy pools in swampy ground, borrow-pits, less frequently in disused wells, rice-fields, drains between rice-fields, sides of canals. Larvæ cannibalistic, at least in captivity.

DISTRIBUTION.—KASHMIR: locality unrecorded, 1922 * (*C. A. Gill*); Jhelum River*, near Wular Lake, 13. x. 1923 (*Sinton*); Srinagar* and Gunderbal*, x. 1923 (*Sinton*); Srinagar*, ix. 1929 (*Barraud*).

Known also from TURKESTAN and westwards to ITALY and ALGERIA.

Specimens from Kashmir are usually larger than those from Egypt and Palestine.

24. **Uranotænia campestris** Leicester, 1908.

Cul. Malaya, p. 213 (♂ & ♀). TYPE-LOC.: Malay Peninsula (*Leicester*). TYPE: co-types ♂ & ♀ in Brit. Mus.

var. n. *zelena* (see p. 69). TYPE-LOC.: Pir Pao, Bombay, xii. 1919 (*Christophers*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—Distinguished by the apically banded abdominal tergites. Wing about 1·8 mm.

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† Joyeux 1918, p. 534; Séguy 1924, p. 64; Theodor 1924, pp. 341–5; Kirkpatrick 1925, p. 70; Martini 1930, p. 197; Montschadsky 1930, p. 580.

‡ Edwards 1922 *b*, p. 91; Barraud 1926, p. 339.

♀.—*Head*: vertex and nape covered with brownish-black or purplish flat scales; a thin line of bluish-white scales to eye-margins, turning inwards at sides towards *apn*; very few upright scales on nape. Antennæ, clypeus, palpi, and proboscis dark brown, the last indefinitely paler beneath; palpi scarcely longer than clypeus; proboscis about 1·2 mm. long. *Thorax*: integument of mesonotum deep brown, covered with bronzy dark brown scales and dark bristles; a line of broad bluish-white scales from wing-root along lateral margin to *ppn*. Postnotum and integument of pleuræ dark brown; usually a lighter area in middle of mesepimeron. Flat bluish-white scales on *apn*, continued as a line across pleuræ to middle of anterior margin of mesepimeron; small spots of similar scales on coxæ. *Wings*: dark scaled, except for a line of pale scales along vein 1 from base to nearly level of base of 2. *Legs*: unmodified, dark brown; undersides of femora paler. *Abdomen*: dorsum dark brown, with apical pale median patches on I–IV, which appear dull white, greyish, ochreous, or brownish, according to angle of light; V with complete white apical band continued to sides; no separate lateral pale patches on abdomen; tergites VI and VII completely dark brown; sternites mainly pale-scaled.

♂.—Resembles ♀, except for plumose antennæ. *Hypopygium* (fig. 18, **e**): style short and wide for the whole length.

var. n. **zelena**.—Differs from type-form as follows:—Abdomen with separate lateral pale patches on II–IV, usually a few pale scales at apex of VI in middle. Few, if any, pale scales at base of wing in ♀. (Larva of this form at present unknown.)

PUPA and EGG.—Unknown.

LARVA of type-form (Ceylon) †.—The following points can be made out from figures given by Senior-White (1927):—Frontal hairs *B* and *C* stout leaf-like barbed bristles, *A* with about 4 fine branched, *d* with 3, and *e* with 2; about 9 pointed comb-teeth (no lateral plate shown), about 11 pecten-teeth, of usual form, siphon-tuft with about 8 branches, its base close to the most distal pecten-tooth; *lh* with 5 branches, anal papillæ fairly long, narrow, and pointed.

HABITAT.—Streams and rock-springs (*Senior-White*).

DISTRIBUTION.—Type-form:—INDIA: Pusa *, Bihar, 20. ix. 1912 (*Sharma*), and 17. x. 1922 (*Shaffi*); Delhi *, 24. viii. 1927 (*Senior-White*); Saharanpur *, U.P., 25. ix. 1927 (*Sinton*). ASSAM: Golaghat *, Sibsagar dist., xii. 1924, ii., xi., & xii. 1925 (*Barraud*). CEYLON: Suduganga *, Matale dist., 26. ii. 1920 (*Senior-White*).

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† Senior-White 1920, p. 319, and 1927, p. 66.

var. *zelena*:—BOMBAY: Pir Pao *, as above. COORG, Somwarpet *, vi. 1927 (*J. D. Baily*). N. KANARA DIST.: Karwar, 1901–5 (*Cogill*).

Known also from MALAY PENINSULA.

25. **Uranotænia macfarlanei** Edwards, 1914.

Bull. Ent. Res. v, p. 127 (♀). TYPE-LOC.: Hongkong (*Macfarlane*). TYPE: ♀ in Brit. Mus.

ADULT †.—Distinguished by abdominal markings and absence of blue tint in thoracic scales ‡. Wing 2–2·5 mm.

♀.—*Head*: a narrow border of white scales to eyes, widening out at sides, remainder of vertex and nape covered with brownish-black, or purplish-black, flat scales; very few upright scales on nape. Tori brown, darker on inner sides; flagellum, clypeus, palpi, and proboscis dark brown, underside of last indistinctly pale; length of proboscis about 1·6 mm.; palpi projecting slightly in front of clypeus. *Thorax*: integument of mesonotum deep brown, fairly densely covered with a mixture of dark and pale brown and ochreous narrow scales; a line of lanceolate white scales along lateral margin from wing-root, not continued beyond level of anterior spiracle; scales anterior to this ochreous, a moderate number of fairly long dark bristles; postnotum dark brown; integument of pleuræ black, an indistinct greyish area on mesepimeron; a line of brownish-white scales on *apn*, continued across pleuræ to middle of anterior margin of mesepimeron, small white spots on coxæ. *Wings*: dark scaled, except for a line of pale scales along about basal ¼ of vein 1. *Legs*: unmodified, dark brown; undersides of femora paler, tips of femora and tibiæ indistinctly pale. *Abdomen*: dorsum dark brown, with well-defined apical white, or creamy, bands on tergites I and V, continued to sides; median apical markings of same colour and small separate lateral white patches on II–IV; VI with a small median pale patch and small lateral pale markings; VII dark brown; venter hidden.

♂.—Markings as in ♀, except that, in some specimens, there is a small area of pale scales on vertex. *Hypopygium*: style short, about 4 times as long as wide, of fairly even width throughout.

LARVA.—Has not been isolated in India, but has been described by Brug (from Java) § as follows:—" Head rather broad, with the usual two pairs of thick spiny hairs. Mental plate a little bit broader than long, bearing 13 teeth. Antenna

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† Edwards 1922 *d*, p. 460.

‡ The Malayan *U. argyrotarsis* Leic. is rather similar, but has the hind tarsi broadly white-tipped.

§ Brug 1932, p. 74.

with a simple short hair near its base; terminal bristles shorter than half the antenna. Comb on the eighth segment consisting of about 10 smooth, pointed teeth. Siphon cylindrical, index 4, pecten-teeth about 14, densely fringed, siphon-tuft beyond the middle with about 9 branches. Inner dorsal hair of anal segment three-branched, outer one two-branched; lateral hair moderately long, six-branched. Gills shorter than anal segment. Described from three larval skins and two larvæ, found in a small pool with dirty water (rotten leaves) near Dago (Preanger Regentschappen, Java) at about 900 m. above sea-level."

DISTRIBUTION.—ASSAM: Golaghat*, Sibsagar dist., xii. 1924, i. & ii. 1925, caught in jungle (*Barraud*).

Known also from MALAY PENINSULA, SUMATRA, JAVA, and HONG KONG.

26. **Uranotænia longirostris** Leicester, 1908.

Cul. Malaya, p. 217 (♂). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ in Brit. Mus.

ADULT.—A small blackish species recognized by the unusually long proboscis, and by the single white mark on the abdomen. Wing about 1·5 mm.

♀.—*Head*: mainly covered with flat bluish-white scales, some towards nape darker, appearing purplish-bronze, very few upright scales; antennæ, clypeus, palpi, and proboscis brownish-black, palpi scarcely longer than clypeus, proboscis longer than whole body, approximate length 2 mm. *Thorax*: mesonotum brownish-black, scales narrow and dark brown, a line of broad bluish-white scales from wing-root, along lateral margin, to *ppn*, bristles dark brown, fairly numerous and long, brownish-black flat scales on scutellar lobes, postnotum almost black, integument of pleuræ brownish-black, a line of bluish-white flat scales on *apn* continued across pleuræ; no spiracular bristle. *Wings*: dark scaled. *Legs*: rather long, unmodified, dark brown, undersides of femora conspicuously white. *Abdomen*: black, tergite IV with large lateral white patches, which may meet on dorsum to form a narrow apical band.

♂.—Markings as in ♀, antennæ moderately plumose, hairs very fine, tarsal claws of fore leg rather broad. *Hypopygium*: style short and wide, with a moderate appendage.

PUPA and EGG.—Unknown.

LARVA (3rd stage).—Preclypeal spines short, stout, bluntly pointed; frontal hairs *B* and *C* very stout leaf-like bristles, finely barbed; hairs *A* and *d* small, each of 2 fine branches; hairs *A*, *B*, and *d* in transverse line; *C* posterior and slightly internal to *B*; *e* posterior and external to *C*, very fine and split into 2. Lateral hairs on thorax and on segments I and II of abdomen fairly strong, majority branched, a few single, hairs on remaining segments very small and fine; no definite lateral plates on VIII, comb of 5 or 6 pointed teeth, one in middle larger than others. Siphon about 0·32 mm. long (not including valves, which are comparatively very large), only slightly longer than anal segment, and of about even width throughout, pecten of about 7 comparatively large teeth occupying basal ½ of siphon, tuft at about middle of tube, slightly nearer base than most basal pecten-tooth, of about 8 fine branches. Both *isc* and *osc* of 2 branches, anal fan very small, a few hairs arising close together, no definite fan-plate.

HABITAT.—Ponds (*Leicester*); clear pools at side of stream (*Chowdhury*).

DISTRIBUTION.—ASSAM: Hathikuli Tea Estate*, Sibsagar dist., vii. 1930 (*K. L. Chowdhury*).

Originally described from the MALAY PENINSULA.

27. **Uranotænia atra** Theobald, 1905.

Ann. Mus. Nat. Hung. iii, p. 114 (♀). TYPE-LOC.: Muina, New Guinea, 1900 (*Biró*). TYPE: ♀ in Nat. Mus. Hung., Budapest.

Uranotænia lateralis Ludlow, 1905, Can. Ent. xxxvii, p. 385 (♀, *U. cœruleocephala* var. *lateralis*). TYPE-LOC.: Mindanão, Philippine Is., 25. vi. 1905 (*Vedder*). TYPE: 4 co-type ♀♀ in U.S. Nat. Mus.

Uranotænia cancer Leicester, 1908, Cul. Malaya, p. 215 (♂ & ♀). TYPE-LOC.: Port Swettenham and Klang, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Uranotænia ceylonica Theobald, 1910, M. C. v, p. 503 (♀, figs. wing). TYPE-LOC.: Galle, Ceylon, 10. iv. 1907 (*T. B. Fletcher*). TYPE: ♀ in Brit. Mus.

ADULT †.—A small dark brown species, with bright blue scales on head and pleuræ, a line of flat scales in front of wing, and lateral pale spots on abdomen; ♂ with modified fore and mid-tarsi ‡. Wing about 1·6 mm.

♀.—*Head*: a border of bright blue or bluish-white flat scales to eye-margins, widest in middle; behind this there are dark bluish or bronzy flat scales and a few upright scales; tori, clypeus, and palpi light brown, proboscis and flagellum of antenna darker brown, palpi only a very little longer than clypeus. *Thorax*: integument of mesonotum brown, thickly covered with narrow dark brown scales, a number of rather

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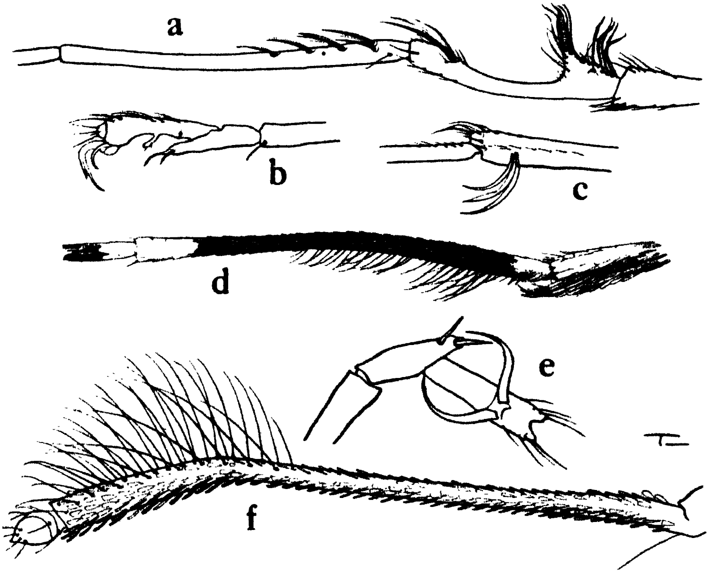
† Theobald 1907, p. 563; Edwards 1913 *b*, p. 238; 1922 *d*, p. 460 (syn.); 1924, p. 357; Barraud 1926, p. 340.

‡ [*U. subnormalis* Mart. (*roperi* Edw.), of Borneo and Singapore, is rather similar, but *hind* (not front) tarsi of ♂ modified.]

long dark bristles, a short line of bright blue flat scales in front of wing-root, scutellar scales flat and dark brown, postnotum dark brown, integument of pleuræ dark brown on upper part, lighter near coxæ and on lower part of mesepimeron, some flat blue scales on *apn* and a large patch of similar scales in middle of sternopleura, not forming a line across pleuræ. *Wings*: dark scaled, anterior fork-cell very short. *Legs*: dark brown, segment 1 of fore tarsi ⅝ length of tibia, that of hind leg a little shorter than tibia. *Abdomen*: dorsum brownish-black, with small apical lateral white patches, venter mainly pale scaled.

Fig. 17.



Secondary sexual characters of ♂ *Uranotænia*: **a**, **b**, **c**, *atra*, base of front tarsus, tip of middle tarsus, tip of hind tibia; **d**, *christophersi*, base of hind tarsus; **e**, **f**, *edwardsi*, tip of middle tarsus, proboscis.

♂.—Segment 1 of fore tarsi only ½ length of 2 and a little more than ¼ length of tibia, thickened at base and tip where there are long hairs (fig. 17, **a**), tibia of mid-leg longer than all the tarsal segments together, segments 4 and 5 of tarsi modified (fig. 17, **b**), hind tibia with a few peculiar scales near tip (fig. 17, **c**); markings as in ♀, antennæ plumose. *Hypopygium*: style (fig. 18, **g**) rather short and widened on apical ½.

Pupa and Egg.—Unknown.

LARVA (fig. 16, a–d) †.—Preclypeal spines short and stout, tips pointed; frontal hairs as figured, *B* and *C* moderately stout. Hairs on thorax and segments I and II of abdomen moderately developed, those on III–VII fine and small; comb-plates large, with 6–9 pointed teeth, finely fringed laterally, on posterior border in a row. Siphon about 0·44 mm. long, index rather less than 3, pecten of 9–12 teeth, occupying less than basal ½ of siphon, teeth transparent, enlarged towards apex, densely fringed, hair-tuft of about 12 fine branches, base slightly beyond most distal pecten-tooth. Both *isc* and *osc* of 2 branches, *lh* of 6–8 fine short branches.

HABITAT.—Crab-holes, stagnant pools, or swamps (*Leicester*); brackish water on coral islet (*Brug*).

DISTRIBUTION.—BOMBAY: Pir Pao*, xii. 1919 (*Christophers*). ANDAMAN IS.*, ix. 1911, caught from crab holes (*Christophers*). CEYLON: Colombo*, 1913 (*James*); Galle, 10. iv. 1907 (*T. B. Fletcher*).

Range extends through MALAY PENINSULA and ARCHIPELAGO and SIAM to NEW GUINEA, AUSTRALIA, and the PHILIPPINES.

28. **Uranotænia testacea** Theobald, 1905.

Ann. Mus. Nat. Hung. iii, p. 113 (♀, pls. ii and iii, figs. wing and wing-scales). TYPE-LOC.: Singapore, 1902 (*Biro*). TYPE: ♀ in Nat. Mus. Hung., Buda Pest.

Uranotœnia falcipes Banks, 1906, Phil. Journ. Sci. i, p. 1004 (♂ & ♀). TYPE-LOC.: Rizal, P.I., 22. ii. 1906 (*Banks*). TYPE: ♂ & ♀ in Bureau of Sci., Manila.

Uranotœnia unilineata Leicester, 1908, Cul. Malaya, p. 220 (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—A medium-sized dark species with blue scales on head and pleuræ, but none above wing-root. Wing 2·4–2·7 mm.

♀.—*Head*: upper surface covered with bright blue or bluish-silvery flat scales, a darker median patch on vertex, a few small dark upright scales on vertex and nape; tori and clypeus pale brown, former darker on inner sides, flagellum, palpi, and proboscis dark brown, palpi only slightly longer than clypeus, proboscis about 1·7 mm. long. *Thorax*: integument of mesonotum bright brown, with a thin covering of brown narrow scales, a moderate number of dark bristles, no flat scales along lateral margin; postnotum light brown; a line of flat bluish-silvery scales from head across pleuræ to anterior border of mesepimeron, including *apn*, integument

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† Brug 1924 *a*, p. 441.

‡ Theobald 1907, p. 560; Edwards 1913 *b*, p. 239 (syn.); Barraud 1926, p. 342.

dark above and below this line, also upper part of mesepimeron, remainder pale brown; no spiracular bristle. *Wings*: dark scaled. *Legs*: dark brown, femora paler ventrally, apical ⅗ of segment 3 and whole of 4 and 5 of hind tarsi creamy white, sometimes a pale area beneath tibio-tarsal joint; tarsi of fore and mid-legs appear very pale in some positions, but are not definitely pale-scaled, segment 1 of hind tarsi a little longer than tibia. *Abdomen*: dark brown dorsally, paler ventrally.

♂.—Markings as in ♀, antennæ plumose. [Legs unmodified, except that the middle femora have a few long, fine, erect hairs about the middle, such hairs not occurring in related species.] *Hypopygium*: style (fig. 18, **h**) of moderate length and width, appendage unusually long and stout.

LARVA, PUPA, and EGG.—Unknown.

DISTRIBUTION.—LOWER BURMA: base of Dawna Hills*, 4. iii. 1908 (*Annandale*). ASSAM: Gauhati*, Kamrup dist., x. 1920 (*Senior-White*); Nongpoh*, Khasi Hills dist., 14. xi. 1921 (*Christophers*); Golaghat*, Sibsagar dist., i. & ii. 1925 (*Barraud*); S. INDIA: Mudigere*, Mysore, 1931 (*Anantaswami Rao*).

Also known from the MALAY PENINSULA and PHILIPPINES.

29. **Uranotænia annandalei** Barraud, 1926.

Ind. Journ. Med. Res. xiv, p. 343 (♂ & ♀, ♂ hypop. fig.). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, xii. 1924 and i. 1925, caught in jungle (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀.—Very similar to *U. testacea*, differing as follows:—*Head*: a border of bluish-silvery flat scales to eyes, brownish or dark bluish flat scales over remainder of upper surface; antennæ, clypeus, palpi, and proboscis dark brown. *Thorax*: mesonotum darker, covered with dark brown narrow scales, a small patch of greyish-brown rather broad scales over each wing-base, not forming a line along lateral margin. *Legs*: tarsi entirely brown, segment 1 of hind tarsi same length as tibia.

♂.—Segment 1 of hind tarsi shorter than tibia. [Middle femora without long hairs in middle.] *Hypopygium*: style (fig. 18, **i**) very short, wide on basal ½, much narrower towards tip.

PUPA and EGG.—Unknown.

[LARVA (4th stage)†.—Has not been isolated in India, the following description being based on specimens from

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† Edwards 1932, p. 559; ascribed doubtfully to *U. testacea*, but fresh material received from Dr. R. B. Jackson has established its identity with *annandalei*.

Hong Kong. Head as in fig. 16, i. Antennæ differing from those of all other species of which the larva is known in bearing three large leaf-like plates, representing modified apical bristles, one being retracted nearly to middle of antenna and borne on a thumb-like projection; shaft-hair subapical in position. Preclypeal spines long and not very stout, with the usual emargination between them. Frontal hair *A* slender and single, *B* and *C* both strong, black, and much flattened, *d* and *e*, both short and single. Abdomen practically bare dorsally, with well-developed lateral hairs only on the first three segments. Comb-plates connected by a dorsal saddle which is not much narrower than the plates; comb-teeth sharp-pointed, about 4 in number. Siphonal index about 2·5, large tuft near middle, with 8–10 somewhat flattened, narrowly lanceolate branches. Pecten-teeth about 10 in number, widened at tip and fringed on distal margin only. Anal segment ringed, lateral hair small and simple, about 6 bifid or trifid hairs in fan.

HABITAT.—Shady pool in bed of a partly dried stream.]

DISTRIBUTION.—ASSAM: Golaghat*, Sibsagar dist., xii. 1924 and i. 1925 (*Barraud*). LOWER BURMA: base of Dawna Hills*, 4. iii. 1908 (*Annandale*).

Also found in HONG KONG.

30. **Uranotænia nivipleura** Leicester, 1908.

Cul. Malaya, p. 219 (♂ & ♀). TYPE-LOC.: The Gap, Selangor, Malay Penin. (*Leicester*) (♂), and Singapore, bred from larva found in pitcher-plant (*Dr. Finlayson*) (♂). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—A fairly large brown species, with a continuous narrow pale border to mesonotum, pleuræ conspicuously lighter than dorsum of thorax and abdomen. Wing about 3 mm.

♀.—*Head*: a line of pale brown scales to eye-margins, dark brown flat scales and numerous upright fork-scales on vertex, latter appearing pale brown in side view; antennæ, clypeus, palpi, and proboscis dark brown, palpi about twice length of clypeus. proboscis a little longer than abdomen, approximate length 1·8 mm. *Thorax*: integument of mesonotum dark brown, covered with brown scales and fairly numerous long curved bristles, a thin line of narrow white scales along margin of mesonotum from wing-roots continued round front, more or less interrupted by a pair of submedian bare lines running back from front margin; postnotum dark brown; pleuræ uniformly pale yellowish-brown, a few

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† Barraud 1926, p. 343.

pale flat scales on sternopleura and *ppn*. *Wings*: dark scaled. *Legs* rather long but unmodified, dark brown, femora paler beneath, segment 1 of hind tarsi a little shorter than tibia. *Abdomen*: dorsum dark brown, venter pale brown.

♂.—Resembles ♀ except for plumose antennæ. *Hypopygium*: style tapering from base to apex, resembling that of *U. recondita*.

LARVA, PUPA, and EGG.—Unknown.

HABITAT.—Pitcher-plants (Singapore, *Dr. Finlayson*); tree-holes (Muktesar, *Fletcher*).

DISTRIBUTION.—W. HIMALAYAS: Muktesar*, Kumaon, 7,500′, ix. 1922 (*T. B. Fletcher*); Bhowali, Naini Tal dist., 4,600′, vi.–vii. 1925 (*S. Sundar Rao*).

Known also from MALAYA.

31. **Uranotænia maxima** Leicester, 1908.

Cul. Malaya, p. 221 (♀). TYPE-LOC.: The Gap, Selangor, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT †.—A large brown species, distinguished from *U. nivipleura* by presence of dark areas on pleuræ and narrow bands ‡ on some abdominal segments. Wing 3·2–3·7 mm.

♀.—*Head*: a narrow border of dull white broad scales to eyes, vertex and nape mainly dark scaled and with numerous black upright scales extending forwards nearly to eye-margins, a few scales on nape in some specimens; antennæ, clypeus, palpi, and proboscis dark brown, palpi exceeding clypeus by about its length, proboscis about 2 mm. long. *Thorax*: integument, scales, and bristles of mesonotum dark brown, the last moderately numerous, long, and stout, a continuous border of dull white narrow and lanceolate scales from wing-roots along lateral and front margins, more or less interrupted by a pair of submedian bare lines running back from the front, postnotum dark bronzy brown; pleuræ dark brown on upper part bordering mesonotum, including *ppn*, a light transverse band below this, followed by another dark band, remainder light brown, except for indefinite dark patches between coxæ, two patches of creamy flat scales on sternopleura, dull white narrow scales on *apn*. *Wings*: dark scaled, forks longer than usual. *Legs*: dark brown, femora conspicuously pale ventrally, segment 1 of hind tarsi a little shorter than tibia. *Abdomen*: scales on dorsum brownish-black, indistinct pale basal bands, not always pronounced, but usually definite on one or more of the terminal segments.

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† Barraud 1926, p. 347; Edwards 1923, p. 2.

‡ As these bands are not always pronounced, and may be overlooked, this species is brought down in two places in the key (p. 61).

♂.—Very similar to ♀, antennæ moderately plumose. *Hypopygium*: style (fig. 18, **j**) large, swollen on apical ½ and tapering sharply to a point, fairly numerous hairs towards apex, a moderately long terminal appendage.

PUPA and EGG.—Unknown.

LARVA (fig. 16, **m**–**p**).—Distinct from that of any other known Indian species by presence of numerous stellate hairs on thorax and abdomen, the branches of which are stout, with apparently blunt tips, but actually terminating in several minute sharp points. Frontal hairs as figured, *C* short and very stout, resembling a leaflet, *B* single and fairly long. Comb of about 11 fairly large sharp teeth, minutely fringed along sides, comb-plates large, but not connected dorsally. Siphon about 1 mm. long, not including valves, index about 3·3, pecten of about 16 teeth of usual form; *osc* of 2 long branches, *isc* divided into 3, *lh* 3-branched, anal papillæ long and slender, with pointed tips, longest fan-hairs about length of papillæ, no distinct bars to fan-plate.

HABITAT.—Rock-pools at edge of a stream (Malaya, *Hacker*).

DISTRIBUTION.—ASSAM: Shillong *, Khasi Hills, 4,500′, ix. 1917 and 20. ix. 1918 (*T. B. Fletcher*). DARJEELING DIST.: Sureil *, 5,000′, x. 1922 (*Barraud*).

Originally recorded from the MALAY PENINSULA.

32. **Uranotænia bimaculata** Leicester, 1908.

Cul. Malaya, p. 226 (♀). TYPE-LOC.: The Gap, Selangor, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT †.—A brown species of moderate size, distinguished from all others in India by the presence of an oval velvety black spot in front of each wing-base. Wing 2·6–3 mm.

♀.—*Head*: some flat creamy scales at each side continued along eye-margins to middle point as a very narrow border, dark brown scales and numerous light-coloured upright scales over remainder; antennæ, clypeus, palpi, and proboscis dark brown, palpi rather more than twice length of clypeus, proboscis about 1·6 mm. long. *Thorax*: integument of mesonotum dark brown, fairly thickly covered with brown narrow scales, a moderate number of fairly long dark bristles, a large oval velvety black spot immediately in front of each wing-base, some inconspicuous dull white narrow scales on front margin; integument of pleuræ dark greyish-brown, coxæ and *apn* lighter, a patch of dull creamy scales on sternopleura. *Wings*: dark scaled, in some specimens a few scales at base of vein 1 appear pale, *af* only a little shorter than *pf*. *Legs*: unmodified, dark brown, undersides of femora paler. *Abdomen*: brownish-black dorsally, paler ventrally.

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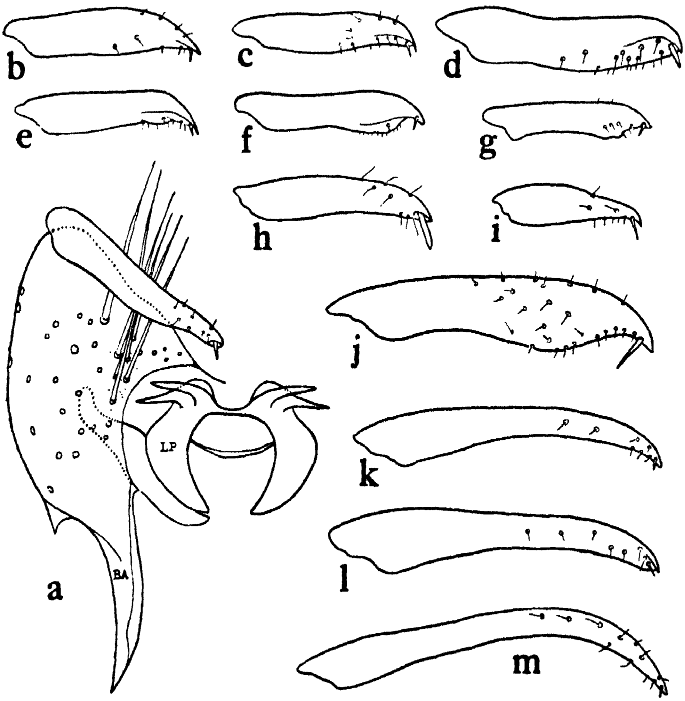
† **Edwards 1921 c, p. 283; Barraud 1926, p. 346; Martini 1930, p. 198.**

♂.—Resembles ♀, but antennæ densely plumose, upright scales on head smaller. *Hypopygium* (figs. 18, **a**): style moderately long, wide on basal ½, apical part recurved and tapering slightly to tip.

PUPA, LARVA, and EGG.—Unknown.

HABITAT.—Tree-holes and bamboos (*Barraud*).

Fig. 18.



a, ♂ hypopygium of *Uranotænia bimaculata*; **b–m**, ♂ style of other species of *Uranotænia*. **b**, *alboannulata*; **c**, *christophersi*; **d**, *unguiculata*; **e**, *campestris*; **f**, *orientalis*; **g**, *atra*; **h**, *testacea*; **i**, *annandalei*; **j**, *maxima*; **k**, *stricklandi*; **l**, *recondita*; **m**, *luteola*.

DISTRIBUTION.—DARJEELING DIST.: Kurseong *, Sureil *, and Mungpoo *, 5–6,000′, ix. & x. 1922 (*Barraud*); Marian barrie Tea Estate *, near Sukna, *c.* 500′, viii. 1928 (*Sobha Ram*).

Also known from the MALAY PENINSULA and JAPAN.

33. **Uranotænia luteola**, sp. n.†

TYPE-LOC.: Malabar Coast, x. 1915 (*Khazan Chand*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Recognized by the uniformly pale pleuræ and banded abdomen and absence of flat or pale scales on lateral margin of mesonotum. Wing about 2·7 mm.

♀.—*Head*: mainly covered with dark brown flat scales and fairly numerous upright scales, latter extending forwards nearly to eye-margins, scales along eye-margins appear lighter; tori and clypeus brown, palpi and proboscis dark brown, palpi about twice length of clypeus, proboscis about 1·6 mm. long. *Thorax*: integument of mesonotum chestnut-brown, scales brown and scanty, bristles black, no flat or pale scales along lateral margin; postnotum deep brown, contrasting with uniform very light brown colour of pleuræ. *Wings*: dark scaled. *Legs*: dark brown, undersides of femora not conspicuously pale, segment 1 of hind tarsi longer than tibia, segment 4 more than 3 times length of 5. *Abdomen*: dorsum dark brown, with well-defined narrow yellowish basal bands on tergites II–VII, all of about equal width; sternites covered with yellowish-brown scales.

♂.—Very similar to ♀, but antennæ plumose. *Hypopygium*: style (fig. 18, **m**) unusually long and slender.

LARVA, PUPA, and EGG.—Unknown.

DISTRIBUTION.—ANDAMAN ISLANDS *, ix. 1911 (*Christophers*). MALABAR COAST *, x. 1915 (*Khazan Chand*).

34. **Uranotænia stricklandi** Barraud, 1926.

Ind. Journ. Med. Res. xiv, p. 345 (♂ & ♀, ♂ hypop. fig.). TYPE-LOC.: Balasum River, near Kurseong, Darjeeling dist., vi. 1923 (♂) (*C. Strickland*); Nilgiri Hills, S. India, x. 1915 (allotype ♀) (*Khazan Chand*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—A brown species of moderate size with well-marked yellowish bands on abdomen and conspicuous dark markings on pleuræ; differs from *U. bicolor* Leic. in pleural markings and in character of mesonotal scaling. Wing 2·2–2·3 mm.

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† [This was described by the author (1926, p. 344) as *U. lutescens* Leic., but, owing to certain discrepancies from Leicester's description, he came to doubt the identity of the Indian form and asked me to compare a pair of specimens from the Malabar Coast with Leicester's types. I have done so, and find a number of distinctions which certainly indicate that two species are involved. *U. lutescens* (of Malaya and Borneo) differs from *U. luteola* as follows:—Close-lying scales of head pale (Leicester said light bronze or fawn-brown), upright forked scales confined to one row of at most a dozen on the nape. Antennæ of ♂ rather more densely plumose. Mesonotum (including postnotum) pale yellowish-brown, no darker than pleuræ. Whitish basal bands on abd. seg. V and VI more distinct than on other segments, that on VI in ♂ occupying ½ the tergite or more, those on II–V in ♀ often interrupted in middle; style of ♂ not quite so slender. Leicester's species was bred from bamboos.—F. W. EDWARDS.]

♀.—*Head*: vertex covered with dark brown flat scales, a narrow border of greyish-white or pale ochreous broad scales along eye-margins and a few similar scales in middle of vertex, very numerous upright pale scales scattered over vertex and nape, continued anteriorly nearly to eye-margins; torus of antenna pale brown, flagellum dark brown, clypeus, palpi, and proboscis dark brown, palpi about twice length of clypeus, proboscis about 1·5 mm. long. *Thorax*: integument of mesonotum pale at sides, dark brown in middle, darkest over wing-roots, a scanty covering of brown or golden scales and a moderate number of dark bristles, no line of flat scales in front of wing-root; postnotum brownish-black; pleuræ yellowish-white, marked with conspicuous brownish-black patches, *apn* and *ppn* dark, a dark area below anterior spiracle extending on to upper part of sternopleura, another dark area in middle of this sclerite, larger part of mesepimeron dark, some broad pale scales between the two dark areas on sternopleura. *Wings*: dark scaled. *Legs*: unmodified, dark brown, femora paler beneath. *Abdomen*: dorsum dark brown, with well-marked basal ochreous basal bands, venter pale.

♂.—Markings as in ♀, antennæ plumose, segment 1 of hind tarsi a little longer than tibia. *Hypopygium*: style (fig. 18, **k**) long and moderately slender, but shorter than that of *U. luteola*.

LARVA, PUPA, and EGG.—Unknown.

DISTRIBUTION.—Type-localities mentioned above; also Mercara *, COORG, S. India, iv. 1928 (*Abdul Majid*).

35. **Uranotænia hebes** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 609 (♀). TYPE-LOC.: Nongpoh, Khasi Hills dist., Assam, iii. 1927, caught in jungle (*Barraud*). TYPE: one co-type ♀ in Brit. Mus., one in M.S.I. coll., Kasauli.

ADULT.—A brown species of moderate size, resembling *U. maculipleura* in general appearance, but differing in having only one small dark area on pleuræ, some pale scales in front of wing-root, shorter palpi, and much less expanded upright scales on head. Wing about 3 mm.

♀.—*Head*: covered with broad flat dark brown scales, those along eye-margins appear pale when viewed in certain positions, a moderate number of upright scales scattered over dorsal surface extending forwards near to eye-margins, the ends of these scales very slightly expanded; torus pale brown, darker on inner side; clypeus brown, palpi quite short, projecting only very slightly in front of clypeus, proboscis dark brown. *Thorax*: integument of mesonotum rather dark brown, covered with narrow brown scales and dark bristles, some lanceolate pale brown scales over wing-root and a small collection of white or creamy lanceolate scales along margin in front of wing-root, some of which are fairly broad, but no line of flat scales in this position; postnotum dark brown; integument of pleuræ pale brown, a small dark area behind anterior spiracle, white lanceolate scales with silvery sheen covering *apn*, some broader pale or silvery scales on *ppn*, sternopleura, and mesepimeron, no spiracular bristle. *Wings*: scales dark brown, forks of about equal length. *Legs*: dark brown, femora paler beneath, segment 1 of fore tarsi a little longer than last four together, segment 1 of hind tarsi very little shorter than tibia. *Abdomen*: dorsum very dark brown, without markings, venter pale brown.

♂ and early stages unknown.

DISTRIBUTION.—Known only from type-locality.

36. **Uranotænia maculipleura** Leicester, 1908.

Cul. Malaya, p. 223 (♀). TYPE-LOC.: 6 miles from Kuala Lumpur Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT.—A medium-sized species of fairly robust build and of general dark brown colour; numerous upright scales on the head with markedly expanded ends. Wing about 2·3 mm.

♀.—*Head*: vertex and nape covered with dark brown flat scales and numerous upright scales extending forwards nearly to eye-margins and with markedly expanded ends, scales along eye-margins appear pale; antennæ, clypeus, palpi, and proboscis dark brown, palpi twice length of clypeus or slightly more. *Thorax*: integument of mesonotum dark purplish-brown, scales narrow and brown, bristles dark brown, no flat or pale scales along margin; postnotum deep brown; pleuræ pale brown, with dark brown patches, *ppn* dark, a small dark area below anterior spiracle, two small dark patches on sternopleura, mesepimeron entirely dark, a few pale broad scales on sternopleura and on *apn*. *Wings*: dark scaled. *Legs*: dark brown, femora not conspicuously paler, segment 1 of hind tarsi very slightly longer than tibia. *Abdomen*: dorsum brownish-black, venter pale brown.

♂ and early stages unknown.

DISTRIBUTION.—DARJEELING DIST.: Marianbarrie Tea Estate *, near Sukna, *c.* 500′, viii. 1928, caught in jungle (*Sobha Ram*).

Originally recorded from MALAY PENINSULA.

37. **Uranotænia bicolor** Leicester, 1908.

Cul. Malaya, p. 225 (♂ & ♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.

Uranotænia fusca Leicester, 1908 (nec Theobald), Cul. Malaya, p. 227 (♂ & ♀). TYPE-LOC. : Sungei Limbing, Malay Penin. (*Daniels*).

Uranotænia leicesteri Edwards, 1913, Bull. Ent. Res. iv, p. 239. Nom. nov. for *U. fusca* Leic.

ADULT *.—A rather large brown species, distinguished from others with banded abdomen by characters given in key. Wing about 3 mm.

♀.—*Head* : vertex and nape covered with dark brown flat scales, and numerous brown upright scales extending well forwards, a narrow border of pale scales to eyes ; torus yellowish-brown, flagellum of antenna dark brown ; clypeus and palpi brown, proboscis darker, palpi about twice length of clypeus. *Thorax* : integument of mesonotum yellowish-brown, with darker areas, one in front of scutellum and one over each wing-root, in some specimens, however, the mesonotal integument is uniformly rather dark brown, a moderate covering of pale ochreous narrow scales, no line of flat scales or narrow white scales on lateral margins, bristles dark brown ; pleuræ brown, lower part of mesepimeron distinctly darker, meron and coxæ pale, some pale flat scales on sternopleura. *Wings* : dark scaled. *Legs* : dark brown, femora lighter beneath towards base. *Abdomen* : dark brown, with well-defined pale ochreous or creamy basal bands on tergites I–VI or I–VII.

♂.—Resembles ♀, but abdominal pale bands usually broader and antennæ plumose. *Hypopygium* : not examined.

PUPA, LARVA, and EGG.—Unknown.

HABITAT.—Marshy edges of jungle-stream (*Leicester*).

DISTRIBUTION.—S. INDIA : Mudigere, Mysore, 1931 (*Anantaswamy Rao*).

Known also from MALAYA.

38. **Uranotænia recondita** Edwards, 1922.

Bull. Ent. Res. xiii, p. 91 (♂ & ♀). TYPE-LOC. : Karwar, N. Kanara dist., viii. & x. 1902 (*Cogill*). TYPE : ♂ and paratype ♀♀ in Brit. Mus.

ADULT †.—A rather small obscure brown species, distinguished by the very bristly mesonotum, absence of ornamentation, uniformly pale pleuræ, and presence of fairly numerous longish upright scales on head. Wing 2·3–2·6 mm.

♀.—*Head* : vertex and nape covered with dark brown flat scales, those along eye-margins somewhat lighter, fairly numerous and rather long brown upright scales scattered over vertex and nape; tori and palpi brown, flagellum, clypeus, and proboscis dark brown, palpi from 2 to nearly 3 times length of clypeus, slightly variable in specimens form different localities, proboscis about 1·7–1·8 mm. long. *Thorax*: integument of mesonotum light brown and often translucent, covered with unusually long and numerous curved dark bristles, scales brown, no flat or narrow white scales on lateral margins; postnotum dark brown; pleuræ uniformly pale brown. *Wings*: dark scaled. *Legs*: unmodified, dark brown, femora paler beneath. *Abdomen*: dorsum deep brown, venter paler.

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* Edwards 1922 *d*, p. 436.

† Barraud 1926, p. 346.

♂.—Resembles ♀, but antennæ plumose. *Hypopygium*: style (fig. 18, l) long and moderately wide, tapering slightly to tip.

PUPA and EGG.—Unknown.

LARVA (fig. 16, j–l).—Preclypeal spines leaf-like, widening out from base, outer side curved, inner straighter, tips bluntly pointed; frontal hairs missing in two damaged skins available; mentum triangular, with 8 or 9 rather blunt teeth on either side of central one. Lateral thoracic hairs well developed, with numerous long branches, some smaller many branched hairs also present; lateral hairs of abd. seg. I and II stout and long, either single or 2-branched, finely barbed, hairs on following segments fine, some long; comb-plates small, comb of 12–14 teeth, with delicate lateral fringes, tips rounded and also fringed (in side view teeth may appear to end in a single point). Siphon slightly more than 1 mm. long, pecten of 22–26 teeth, with broad fringed tips, tuft of about 8 fairly strong branches, the base slightly beyond the most distal pecten-tooth. Both *isc* and *osc* of 2 branches, *lh* of 3 short branches; papillæ damaged, both pairs apparently of moderate length, fan-hairs missing, fan-plate distinctly barred.

HABITAT.—Tree-holes, during the monsoon.

DISTRIBUTION.—N. KANARA DIST.: Karwar, viii. & x. 1902 (*Cogill*), ix. 1921 * (*Barraud*); Kadra *, ix. 1921 (*Barraud*). CENT. PROV.: Buldana, 15. ii. 1923 (*S. Sundar Rao*). N. MADRAS COAST: Vizagapatam *, xi. 1927 (*J. D. Baily*); Muniguda *, Vizagapatam Agency, 12. ii. 1933 (*Senior-White*). ORISSA: Ranchi *, 10. xi. 1930 (*Senior-White*).

Not recorded from elsewhere.

39. **Uranotænia novobscura**, sp. n.

TYPE-LOC.: Sukna, Darjeeling dist., *c.* 500′, x. 1922 (*Barraud*). TYPE: ♂, no. 1276/1861; allotype ♀, and other specimens, from same place, viii. 1928 (*Sobha Ram*).

ADULT.—A small dark brown species without ornamentation, apparently indistinguishable from *U. obscura* Edwards in the adult stage, but differing in the larval stage. Wing 2·2–2·6 mm.

♀.—*Head*: vertex and nape covered with dark brown flat scales and a moderate number of upright scales; some scales at sides appear lighter when seen in certain positions; antennæ, clypeus, palpi, and proboscis dark brown; palpi scarcely twice length of clypeus. *Thorax*: integument of mesonotum and scales dark brown, bristles less dense than in *recondita*; pleuræ pale brown. *Wings*: dark scaled. *Legs*: dark brown, undersides of femora, pale brown; segment 1 of hind tarsi distinctly longer than tibia. *Abdomen*: both dorsum and venter dark brown, without markings.

♂.—Resembles ♀, but antennæ plumose. *Hypopygium*: style fairly long, 8–9 times length of width in middle.

LARVA, 4th stage (described from one damaged skin, from which type ♀ resulted).—*Head*: dark brown, lighter at sides. Antenna very short and rather stout, about 0·14 mm. long; shaft dark brown, bare, except for a hair with several fine branches at about ⅔ from base. Frontal hair *A* with 4 branches, *d* also with several fine branches; *B* and *C* missing, the latter apparently attached some distance posteriorly to other three pairs. Mentum longer than width at base, 6–7 regular teeth on either side of median tooth. *Thorax* with some chitinised plates or tubercles at bases of tufts, the larger tubercle on metathorax with small thorn-like spines. *Abdomen* with long 2-branched hairs on I and II, arising from small plates. Longer hairs on following segments 3-branched; a long single hair on either side of VII. Comb-plates large but not united on dorsum to form a saddle (as is the case in *obscura*). Comb of 7 fairly large pointed teeth in a row, each tooth fringed at base. Subsiphonal tuft of 5 fairly long subplumose branches. Anal segment completely ringed by plate; hind margin finely spinose. Subdorsal and fan-hairs missing; lateral hair of 2 strong branches; fan-plate with distinct bars; papillæ damaged. Siphon moderately dark, slightly tapering, length about 0·5 mm., not including valves; width at base, when compressed, about 0·2–0·3 mm. Acus fairly large. Pecten 17–20 teeth, broad and fringed as usual (not simple as in *obscura*), in a close-set rank, extending beyond middle of tube; siphonal tuft 3-branched, arising near most distal pecten-tooth.

HABITAT.—Bamboos (*Barraud*).

DISTRIBUTION.—Known only from type-locality.

Genus **THEOBALDIA** Neveu-Lemaire, 1902.

C.R. Soc. Biol. liv, p. 1331. Genotype, *Culex annulatus* Schrank.
Pseudotheobaldia Theobald, 1907, M.C. iv, p. 271. Genotype, *P. niveitœniata* Theo.
Allotheobaldia Brolemann, 1919, Ann. Soc. Ent. France, lxxxviii, p. 91. Genotype, *Culex longiareolatus* Macquart.

Adult *.—Mosquitoes resembling large species of *Culex* in general appearance, but distinguished by presence of 5–10 spiracular bristles arranged in a row along anterior margin of anterior spiracle, by presence of hairs on remigium (base of vein 1), especially on underside of wing (fig. 7) †, and by absence of pulvilli. Vertex clothed with curved and upright scales, both narrow, and usually also hair-like false scales; scutellar scales narrow or lanceolate; antennæ in both sexes shorter than proboscis, those of ♂ plumose; palpi of ♀ from $\frac{1}{3}$–$\frac{1}{6}$ length of proboscis, latter of moderate length, palpi of ♂ widened and spatulate at apices, either slightly longer or a little shorter than proboscis; a few posterior pronotal bristles, a row of spiracular, no post-spiracular. Wings fairly broad, subcosta ending slightly nearer tip of wing than level of base of vein 3, vein 6 somewhat sinuous. Tarsal claws of ♀ all simple, those of fore and mid-legs of ♂ toothed.

The genus is divided into several subgenera, two of which occur in the Indian region, *Theobaldia*, s.str., and *Allotheobaldia*; the latter includes only one species, *T. longiareolata* (Macq.).

♂ *hypopygium*: Subgenus *Theobaldia* (fig. 19, **b**, **c**): coxite fairly long, with small subapical and basal lobes, style of moderate length, with terminal appendage; phallosome divided into lateral plates; paraprocts with teeth at crown; tergite VIII with a few strong spines in middle on apical border. Subgenus *Allotheobaldia* (fig. 19, **a**): coxite without subapical lobe, style with double terminal appendage; paraprocts pointed at crown; no spines on tergite VIII.

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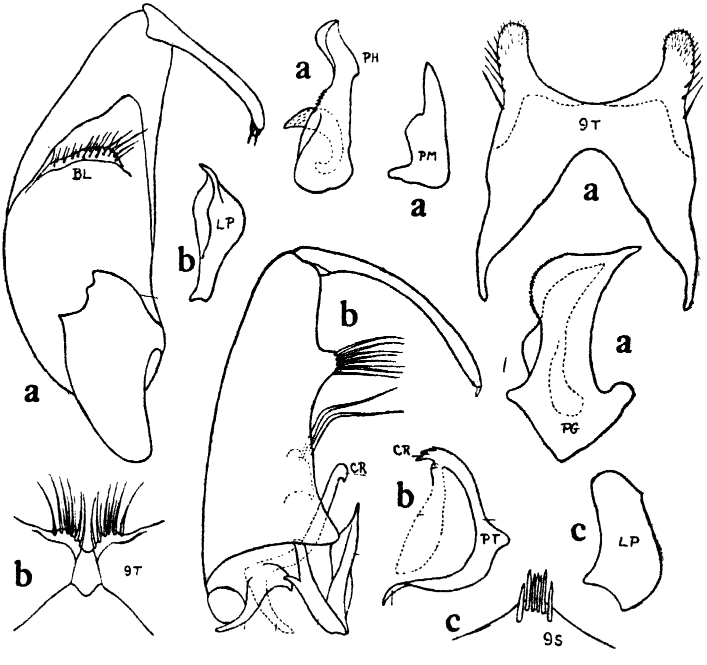
* Edwards 1921 *c*, p. 285; 1924, p. 363; 1932, p. 101; Baini Prashad 1915, p. 501; Christophers 1922, pp. 530–572 (♂); 1923, pp. 698–720 (♂); Barraud 1924 *l*, p. 139; Kirkpatrick 1925, p. 71; Barraud & Covell 1928, p. 676 (buccal cavity); Martini 1930, p. 200.

† [This character was first discovered by Dyar and Shannon (1924), who stated in their key that the hairs on the underside of the wing at the base are on the first vein (stem-vein, remigium, or base of radius). The statement has been repeated by others, including myself and Barraud, but, as has been pointed out to me by Mr. A. J. E. Terzi, it is the base of the subcosta which carries these hairs (as correctly noted by Dyar and Shannon in their *diagnosis* of the genus *Culiseta*); the stem-vein is hidden under the thickened base of the subcosta when the wing is seen from beneath.—F. W. Edwards.]

♀ *hypopygium*: in both subgenera the abdomen is blunt-tipped; VIII not retractile; cerci comparatively small; three chitinised spermathecæ.

Pupa.—Respiratory trumpet short, with large opening; dendritic tufts present on abdominal segment I; lateral hairs on VII and VIII comparatively small; paddles large and rounded, a single apical hair near termination of midrib.

Fig. 19.



♂ hypopygial structures of *Theobaldia*: **a**, *longiareolata*; **b**, *niveitæniata*; **c**, *indica*. Lettering as on p. 4.

Larva, 4th stage (fig. 20)*.—A single pair of hair-tufts on siphon at base; pecten and anal fan well developed; other characters given in descriptions below.

Distribution and Bionomics.—In the Indian region the genus is confined to the north-west and Himalayas; the adults suck human blood and may at times be troublesome. The eggs are laid in boat-shaped masses on water; the larvæ live in ground-pools and sometimes in pools in beds of hill-streams.

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* Edwards 1921 c, p. 287; 1932, p. 102.

The species of *Theobaldia* are few in number, but occur throughout the Palæarctic and Nearctic regions, and also in Africa, Australia, New Zealand, being absent from the Neotropical and the greater part of the Oriental region.

Key to Adults.

1.	Thorax decorated with longitudinal lines of pale scales; anterior edge of costa entirely pale scaled from base to tip of wing	*longiareolata*, p. 88.
	Thorax without pale lines; costa either entirely dark or with a sprinkling of pale scales only	2.
2.	Tarsal segments marked with broad basal white rings...........................	*indica*, p. 93.
	Tarsi entirely dark	*niveitæniata*, p. 91.

40. **Theobaldia longiareolata** (Macquart), 1838.

Dipt. Exot. i, p. 34 (*Culex*) *. TYPE-LOC.: Canary Is. TYPE (if in existence): Paris Museum.

Culex spathipalpis Rondani, 1872, Bull. Soc. Ent. Ital. iv, p. 31. TYPE-LOC.: Italy. TYPE: Florence Mus.

ADULT †.—Wing-length in larger specimens 6·5–7 mm., width 1·5 mm.

♀.—*Head*: a border of fairly broad white scales to eye-margins, continued downwards between eyes; a double line of similar scales from nape to front of vertex and some similar scales along back of head and low down at each side, remainder covered with black scales, long yellowish hair-like false scales, and long upright scales with slightly expanded ends, the last chiefly on nape. Tori brown, with white scales on upper and inner surfaces, white scales on undersides of first two flagellar segments; remainder, as well as clypeus and proboscis, dark brown. Palpi between $\frac{1}{3}$ and $\frac{1}{4}$ length of proboscis, dark brown, heavily sprinkled with white scales, chiefly on upper surface, tips entirely white. *Thorax*: integument brown, a median line of white scales from front margin to scutellum, dividing either side of ante-scutellar space; another line on each side from front margin along lateral border, curving inwards about mid-way between front border and wing-base, then continued in straight line to lateral lobe of scutellum; another indefinite line of white scales

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* [Macquart refers in 'Diptera Exotica' to his description of this species in Webb & Berthelot's 'Hist. Nat. des Iles Canaries,' ii, pt. 2, Zool., Dipt. p. 99. The latter work, however, was not actually published until 1840 (*vide* Wiegmann's Arch. 1841, p. 153), consequently the original reference is correctly given as above.]

† Edwards 1917, p. 228, and 1921 *c*, p. 287 (syn.), 1926 *b*, p. 403; Waterston 1918, p. 9; Barraud 1924 *l*, p. 139; Kirkpatrick 1925, p. 72; Séguy 1925 *a*, p. 79; Martini 1930, p. 214.

laterally over wing-root; remainder covered with narrow, curved, light brown scales; bristles on dorsum short, those laterally over wing-roots longer and yellowish; white lanceolate scales and yellowish bristles on scutellar lobes. Postnotum and integument of pleuræ brown; some fairly broad yellowish scales on upper part of *ppn*, white scales on lower part, and also on sternopleura, mesepimeron, prosternum, coxæ, and lower part of *apn*, a number of yellowish bristles on upper part of last; 5 or 6 spiracular bristles and some hairs, a few rather short posterior pronotal, 4 lower mesepimeral and about 20–24 upper mesepimeral, a group of about 12 sternopleural near lower corner of mesepimeron. *Wings*: front margin of costa continuously pale scaled from base to tip of vein 2.1, otherwise scales are dark, except for a few pale ones on remigium; a few hairs also on upper side of wing on this part, and more numerous hairs in same position on underside. *Legs*: femora mottled or spotted with white or yellowish and brownish-black scales, the pale scales forming almost complete preapical pale rings on fore and hind femora; tibiæ dark, fairly evenly spotted with pale scales on anterior surface; segment 1 of tarsi of all legs pale at base and extreme tip, otherwise brownish-black, streaked with pale scaling; segments 2 and 3 mainly dark with basal pale markings, and pale speckling in some specimens; 4 and 5 on fore and mid-legs dark, segment 4 on hind leg with basal pale marking, 5 dark. *Abdomen*: tergites with basal white bands, otherwise entirely covered with a mixture of pale yellow and dark brown scales, variable in arrangement; in some specimens the tergites are almost entirely pale, in others the pale scaling is confined to the middle and posterior margin of each tergite; in others again the scaling is mainly dark, except for the basal white bands; these different forms possibly represent seasonal or local variations.

♂.—Markings as in ♀, antennæ plumose and barely ¾ length of proboscis, palpi a little shorter than proboscis, last segment and apical part of penultimate widened and spatulate, dark brown, with white scaling on upper side at bases of segments 2–5 and on underside at tips of last two segments, otherwise dark brown. *Hypopygium* (fig. 19, **a**) of very distinctive structure.

PUPA [*].—Respiratory horn short, wide, with large opening, apical part covered with network of small folds. One of the sublateral hairs on tergites V and VI very long and single; a similar hair on IV, but 2-branched; all hairs of posterior margin of VII rather short, lateral hair with several short branches; lateral hair on VIII with a number of moderately long branches forming a tuft, another hair internal to this with 2–3 branches. Paddles large and rounded, posterior margin minutely serrate, a single terminal hair slightly internal to, and beyond, termination of midrib.

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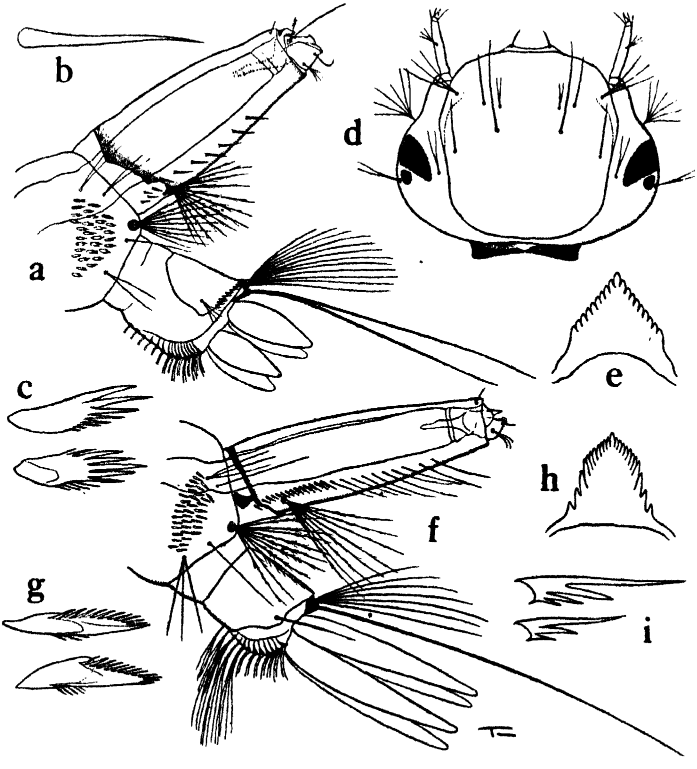
[*] Theodor 1924, p. 341; Kirkpatrick 1925, p. 72.

Larva (fig. 20, **a**–**e**) *.—Length about 10 mm., including siphon, which is about 1·25–1·5 mm. long ; head very dark ;

Fig. 20.



Larval structures of *Theobaldia* : **a**–**e**. *longiareolata* ; **f**–**i**, *niveitæniata*. **b**, **i**, pecten-teeth ; **c**, **g**, comb-teeth.

siphon pale brownish. *Antenna* dark brown, comparatively short, nearly straight and moderately stout, length about 0·32 mm., shaft smooth, with hair-tuft of 2–3 branches arising nearer apex than base. Hairs of mouth-brushes with minute serrations apically. Frontal hairs as figured, *A* 2–3 branched, *B* and *C* single, *d* single or double. Lateral tufted hairs on *thorax* well developed and arising from large chitinised tubercles.

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* Langeron 1918, p. 98 ; Séguy 1924, p. 54 ; Kirkpatrick 1925, p. 75 ; Martini 1930, p. 215.

Lateral hairs on *abdomen* fairly long, especially on I–III: comb a triangular patch of about 45–50 scale-like fringed teeth, each ending in several sharp points. *Siphon* as figured, chitinisation at base towards posterior margin irregular in outline, no definite acus; pecten of 8–10 fairly large widely-spaced teeth, extending from base nearly to apex, several teeth nearest to base with 1–2 lateral denticles, others simple; usually a few additional small teeth on membrane near base of tube; hair-tuft at base of chitinised part of tube near posterior border, with 15–20 subplumose branches; subsiphonal tuft large, with 10–12 branches. *Anal segment* almost completely enclosed in chitinised ring, some large spines on posterior border towards dorsum; *lh* fine and divided into 3–4 short branches; *osc* of 2–3 long branches, *isc* divided into a number of branches all about same length. Anal fan well developed, about 16 hairs arising from fan-plate, each split into a number of fine branches, several branched hairs also arising from membrane between fan-plate and base of segment; dorsal anal papillæ about as long as anal segment, ventral pair shorter, both pairs pointed at tips.

HABITAT.—Pools and ponds.

DISTRIBUTION.—Common in the North-West and Western Himalayas as far east as Naini Tal, but not found in other parts of the Indian region. N.W. FRONTIER: Bannu *, iv.–v. 1917 (*Sinton*); Malakand *, iv. 1931; Taru * (Peshawar), v. 1916 (*T. B. Fletcher*); Cherat *, Idak *, Dera Ismail Khan *. N. BALUCHISTAN: Quetta *, viii. 1911 (*Davys*), and vi. 1923 (*Browse*); Pishin *, vi. 1929; Chaman *, viii. 1931. SIND: Karachi *. WESTERN HIMALAYAS: Murree *, 1922 (*Gill*); Kasauli * and Sanawar *, v. 1911 & vi. 1912 (*Christophers*), and iv.–vi. 1921, 1922, and 1924 (*Barraud*); Naini Tal (U.P.) 7,000′ (*Giles*).

Outside India this species occurs in the MEDITERRANEAN REGION, ATLANTIC ISLANDS, PERSIA, EAST and SOUTH AFRICA.

41. **Theobaldia niveitæniata** (Theobald), 1907.

M.C. iv, p. 272 (*Pseudotheobaldia*). TYPE-LOC.: Dehra Dun, U.P., India, ii. & iii. (*Thompson*). TYPES: 2 ♂♂ in Brit. Mus.

ADULT †.—Distinguished by the dark legs and broad white scutellar scales ‡. Wing about 7–8 mm.

♀.—*Head*: dorsal surface with narrow pale yellow scales, dark upright and narrow hair-like false scales, a patch of

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† Edwards 1921 *c*, p. 287; Barraud 1924 *l*; p. 141, Martini 1930, p. 212.

‡ [The European *T. glaphyroptera*, which is the nearest relative of *T. niveitæniata*, and with which it was at one time confused, has narrow scutellar scales and a different hypopygium.]

broader yellow scales at each side. Tori dark brown, with yellow scales, chiefly on inner sides, flagellum brown, with pale pubescence and brown hairs. Clypeus and proboscis dark brown. Palpi about ¼ length of proboscis, brown, with a plentiful sprinkling of pale scales, tips pale. *Thorax*: integument of mesonotum dark brown, with a sparse covering of golden, narrow, curved scales; bristles fairly numerous but not long, yellow or brown according to the angle of view; scutellar scales white or creamy, fairly broad; bristles long and yellowish. Postnotum and integument of pleuræ dark brown, some yellowish, fairly broad scales on upper part of *ppn*, pale broad scales on lower part and on propleura, sternopleura, mesepimeron, and below margin of mesonotum in front of wing-root; pleural bristles pale, about 8 spiracular, 4 or 5 small *ppn*; bristles on propleura, sternopleura, and upper part of mesepimeron fairly numerous and long; 2 or 3 lower mesepimeral. *Wings*: veins clothed with long narrow dark scales; membrane darker in patches, chiefly in region of cross-veins and at bases of forks, giving the wing a slightly spotted appearance, c.-vs. 2–3, 3–4, and 4–5 closely approximated. *Legs*: bronzy black, marked with white and pale yellow, all the femora with a pale knee-spot, a subapical pale line and spot on anterior surface of fore pair, sometimes confluent and forming a large pale patch; anterior surface of mid-pair dark; posterior surface of fore and mid-pairs pale from base nearly to tip, hind femur white except for a subapical black ring and a dark line along the dorsal edge. Tibiæ dark when viewed from the front, with apical pale ring; pale for whole length when viewed from behind. Tarsi entirely dark, first segment indistinctly paler ventrally at base in some specimens. *Abdomen*: tergites brownish-black, with silvery basal bands; in many specimens the bands are distinctly narrower in the middle of each tergite; sternites mainly covered with pale yellow scales and with small lateral basal silvery spots.

♂.—Resembles ♀, but antennæ plumose; palpi slightly longer than proboscis, dark brown, paler at joints; some long hairs on segments 3 and 4, shorter hairs on 5, which is widened and spatulate. *Hypopygium* (fig. 19, **b**): very similar to that of *T. indica*, differing in shape of *lp* and in having fewer small spines on apical border of 8*t*.

PUPA.—Unknown.

LARVA (fig. 20, **f–i**).—Length about 9 mm., including siphon, which is 1·3–1·5 mm. long. *Antenna* pale brown, about 0·5 mm. long, hair-tuft of 4–5 branches, arising at about middle of shaft, latter smooth. Median hairs of mouth-brushes minutely serrate. *Frontal hairs* as figured, *A*, *B*, and *C* all equally developed, each usually with 3–10 moderately long branches. Lateral tufted hairs on *thorax* well developed and arising from chitinised tubercles. Some fairly long lateral hairs on abdomen. *Comb* of 45–50 scale-like fringed teeth in a triangular patch ; subsiphonal tuft large, with 8–12 subplumose branches. *Siphon* about 3 times length of diameter at base ; acus fairly large ; pecten of 12–16 strong teeth with 3–4 lateral denticles, commencing from base, usually 3–4 smaller teeth in addition close together at base ; distal to the teeth a row of about 15 hairs forming a continuation of the pecten and extending nearly to apex of tube ; hair-tuft at base, near posterior margin, usually of 8–10 long branches. *Anal segment* enclosed in chitinised ring, without large spines on posterior margin ; *lh* fine, with 2–3 branches ; *osc* single and long, *isc* divided into a number of branches subequal in length ; fan well developed, about 14 branched hairs arising from fan-plate ; 2 or 3 branched hairs on segment between plate and base ; both pairs of papillæ long and pointed, distinctly longer than anal segment.

HABITAT.—Pools in beds of hill-streams.

DISTRIBUTION.—WESTERN HIMALAYAS : Kasauli *; common from ii.–iv. (*Christophers & Barraud*) ; Murree *, 1922 (*Gill*) ; Theog *, Hindustan-Tibet road, 8,000′, 2. v. 1907 (*Annandale*) ; Naini Tal * (C.M.B. Records), Muktesar *, v. 1923 (*T. B. Fletcher*) ; Dehra Dun (type-loc. as given above). EASTERN HIMALAYAS : north of Yatung *, Tibet, near Sikkim border, *c.* 12,000′ (*H. W. Mulligan*).

Not known from elsewhere.

42. **Theobaldia indica** Edwards, 1920 †.

Bull. Ent. Res. x, p. 137 (♂ & ♀). TYPE-LOC. : Bakloh, Gurdaspur dist., Punjab, 5,000′, 28. ii. 1900 (*Lindesay*). TYPE : ♂ in Brit. Mus.

ADULT ♀ ‡.—Resembles *T. niveitæniata* in general appearance but differs as follows :—Proboscis with plentiful sprinkling of pale scales on about basal ¾ ; palpi about ⅕ length of proboscis ; scutellar scales narrow, pale in colour ; about 10 spiracular bristles. *Wings* with plentiful sprinkling of pale scales along costa, subcosta, vein 1, and usually a few at base of 5 ; membrane not definitely clouded, but aggregations of scales at base of 3 and at bifurcations of 2 and 4, giving the wing a slightly spotted appearance. *Legs* brownish-

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† This species was recorded from India by Giles as *Culex annulatus* Schr., and by Theobald as *Theobaldia annulata* (Schr.), and was included under the latter name in Brunetti's and Senior-White's Catalogues. *T. annulata* is a Palæarctic species, and is not known from the Indian region at present ; it differs from *indica* in having a pale ring at middle of segment 1 of hind tarsus.

‡ Barraud 1924 *l*, p. 142.

black, with pale ochreous markings; a plentiful sprinkling of pale scales on femora and tibiæ, pale dorsal marks at apices of latter, ventral surface of femora almost entirely pale; pale scales on hind tibiæ tend to form stripes; tarsi dark, with rather broad basal pale rings to segments 2, 3, and 4, that on 4 very small on fore legs; segment 1 on each leg narrowly pale at base, and with sprinkling of pale scales on basal ½ or more. Dorsum of *abdomen* brownish-black, with basal white bands of even width on tergites III–VI, some pale scales in middle of I, a pale basal band on II, produced in middle towards posterior margin; usually lateral pale patches on VII; venter covered with dull white scales and with indistinct lateral darker markings.

♂.—Antennæ plumose; proboscis sometimes pale for nearly whole length; palpi a little longer than proboscis, dark brown, pale yellowish at joints, and with extensive mottling of pale scales, some long hairs at apex of segment 3 and along 4, 5 less expanded than in the other Indian species. *Hypopygium* (fig. 19, **c**): very similar to that of *T. niveitæniata*, differing chiefly in the shape of the apical border of *8t* and in form of *lp*.

PUPA, LARVA, and EGG.—Unknown.

DISTRIBUTION.—WESTERN HIMALAYAS and PUNJAB only: Bakloh (type-loc. as above); Dalhousie, Gurdaspur dist., 6,000′, 4. v. 1906 (*Barrow*); Kasauli *, Simla Hills, 6,000′, iii. & v. 1921, ii. 1924, ix. 1923 (*Barraud*), and ii. 1926 (*Sinton*); Muktesar *, Kumaon (U.P.) 7,500′ (*T. B. Fletcher*); Ambala, Punjab, 9. iii. 1905.

Not known from elsewhere.

Genus **ORTHOPODOMYIA** Theobald, 1904.

Entom. xxxvii, p. 237. Genotype, *O. albipes* Leic.

ADULT †.—Mosquitoes of moderate size, resembling some *Anopheles* in having spotted wings (fig. 21, **a**), speckled legs, and black and white rings on hind tarsal segments, or with the last three segments entirely white. The genus differs from other Culicini in the proportionate length of tarsal segments of fore and mid-legs; tarsal segment 1 rather longer than last four together, 4 very short in both sexes, much shorter than 5, and only a little longer than broad (fig. 21, **b**), 4 and 5 together about as long as 3; claws of ♀ simple, larger claw of fore leg of ♂ toothed. Antennæ in both sexes about length of proboscis, those of ♂ plumose. Palpi of ♂ nearly

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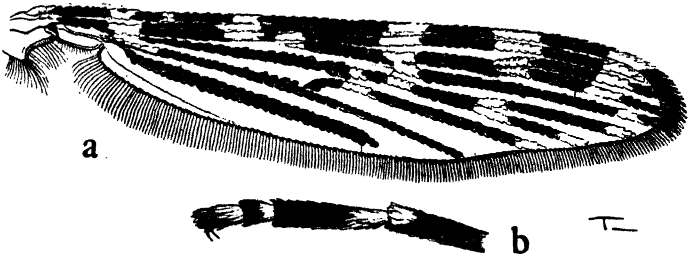
† Edwards 1932, p. 106. See also Theobald 1907, p. 527; Lang 1920, p. 109; Barraud 1927 *a*, p. 525; Barraud & Covell 1928, p. 676 (buccal cavity); Martini 1930, p. 193.

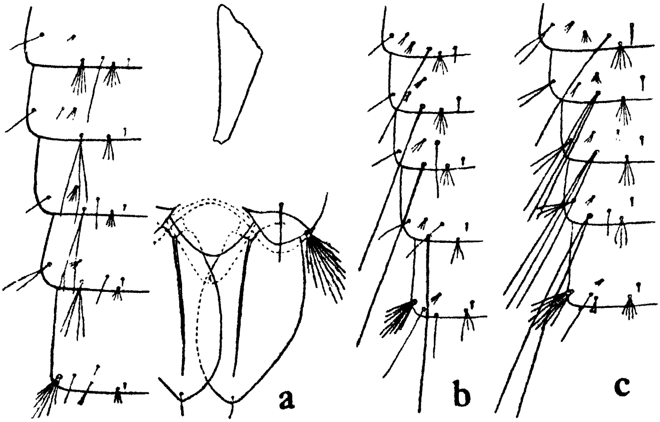
as long, or quite as long, as proboscis, the last one or two segments short and not swollen or very hairy; those of ♀ about $\frac{1}{3}$ length of proboscis. Wings rather narrow, with very long fork-cells; vein *sc* long and terminating at about level of bifurcation of 2; vein 6 long, terminating much beyond fork of 5; squama fringed. Bristles on mesonotum well developed; 2–4 posterior pronotal, no spiracular, post-spiracular, or lower mesepimeral, but upper mesepimeral and sternopleural fairly numerous.

Fig. 21.



Orthopodomyia anopheloides: **a**, wing; **b**, tip of front tarsus of ♀.

Fig. 22.

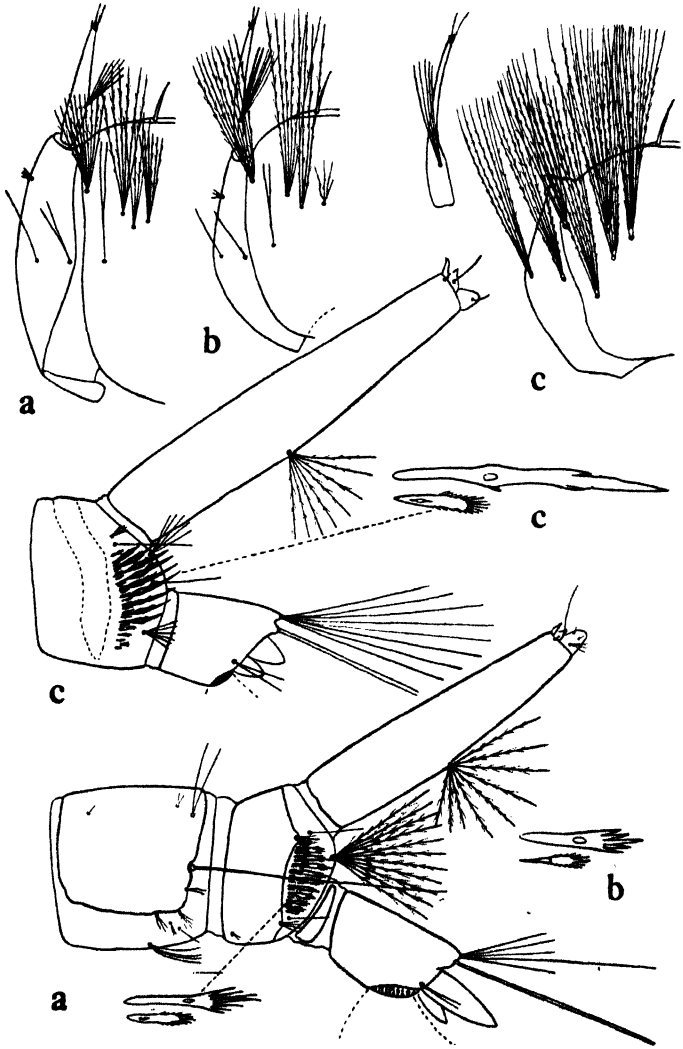


Pupal structures of *Orthopodomyia*, showing dorsal chætotaxy of abdominal segments III–VII, etc.: **a**, *anopheloides* (with respiratory trumpet and paddles); **b**, *flavicosta*; **c**, *flavithorax*.

♂ ***hypopygium***: apical border of tergite VIII produced into a median plate; coxite moderately long and narrow, with basal lobe on inner surface and with style at apex carrying terminal appendage; phallosome small and simple; paraprocts with teeth at crown.

♀ *hypopygium*: cerci of only moderate length; three chitinised spermathecæ present.

Fig. 23.



Larval structures of *Orthopodomyia* (head, tail-end, enlarged comb-scales): **a**, *anopheloides*; **b**, *flavicosta*; **c**, *flavithorax*.

Pupa (fig. 22) *.—Respiratory horn of moderate length, with wide opening; dendritic tufts on abd. seg. I well developed; one of the five submedian and sublateral hairs on tergites IV–VI long; tufted lateral hairs on VII and VIII fairly large. Paddles nearly twice as long as broad, rather flattened on outer side towards apex, apical ½ very transparent, a short terminal hair, moderately developed midrib, an irregular dark marking across the base.

Larva *, 4th stage (fig. 23).—Siphon without pecten, a single pair of hair-tufts at about middle of tube towards posterior margin; comb with 2 rows of teeth; some long single hairs on abdomen; antennal shaft smooth, tuft at ¼ or ⅓ from base. In *O. anopheloides* and *O. flavicosta* there is a chitinised saddle on abd. seg. VIII, and in the former there is a well-developed saddle on VII also, but in *O. flavithorax* there is no very definite saddle on either segment, only some indefinite chitinisation on VIII.

Eggs †.—Those of Indian species are unknown.

Distribution and Bionomics.—Several species appear to have a very local and limited distribution, but *O. anopheloides* (Giles) is widely spread in India. Little is known of the habits of the adults, and they are not known to attack man. The larvæ live in water in tree-holes, and are commonest during the monsoon. All the Oriental species occur in the Indian region; others are known from North and South America and Europe and one from Mauritius, but none from Africa or Australia.

Key to Adults.

1. Three white spots on costa on apical ½ of wing, in addition to 1–3 small spots on costa on basal ½. Palpi of ♂ shorter than proboscis	2.
Two white spots on costa on apical half of wing (the spot near apex of wing often small); small spots on basal ½ of costa present or absent. Palpi of ♂ as long as proboscis	5.
2. Last three hind tarsal segments completely white	3.
Last three hind tarsal segments not completely white; second dark at base	4.
3. Second hind tarsal segment dark at base, narrowly white at tip	[*andamanensis*, p. 102. *anopheloides* var. n.
Second hind tarsal segment narrowly white at base and usually also at tip	*albipes*, p. 102.
4. Segments 4 and 5 of hind tarsi completely white	[*maculipes*, p. 101. *anopheloides* var.
Segment 4 of hind tarsi with black subapical ring, segment 5 white	[var. *maculata*, p. 101. *anopheloides*, p. 98, and

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* Barraud 1932, p. 1013; Edwards 1932, p. 107.

† Howard, Dyar & Knab 1917, p. 878.

5. Mesonotal scales mainly rather bright golden; two pale spots at base of costa, but no scattered yellow scales on basal ½ of that vein; often no white spot on vein 5 at fork in ♀ .... *flavithorax*, p. 103.
   Mesonotal scales brownish; at most one pale spot at base of costa, but scattered yellow scales present on basal ½ of that vein; a white spot on vein 5 at fork in both sexes .... *flavicosta*, p. 104.

Key to Pupæ.

1. Longest hair on tergite VI reaching beyond posterior margin of VIII, and either single or 2-branched .... 2.
   Longest hair on VI not reaching beyond posterior margin of VII, and usually of 4 branches (fig. 22, **a**) .... *anopheloides*.
2. Longest hair on IV–VI single (fig. 22, **b**)......... *flavicosta*.
   Longest hair on IV and V 3-branched, that on VI 2-branched (fig. 22, **c**) .... *flavithorax*.

Key to Larvæ (4th stage).

1. Abd. seg. VII with a large chitinised saddle; one branch of *isc* much longer than the others; a separate lateral chitinised strip at base of anal segment on each side (fig. 23, **a**) .... 2.
   Abd. seg. VII without a chitinised saddle; all branches of *isc* about the same length; no separate chitinised strip at base of anal segment. 3.
2. Comb-teeth of larger row with long lateral branches. *anopheloides*.
   Comb-teeth of larger row with short fringe only . *albipes*.
3. Larger comb-teeth ending in a single long point; 5 pairs of clypeal hairs equally developed, and with long plumose branches; hairs on sides and dorsum of thorax remarkably developed and with long plumose branches (fig. 23, **c**) .... *flavithorax*.
   Larger comb-teeth ending in several sharp points; frontal hair *d* comparatively small, with only 3 or 4 fine branches, *e* fine and single or split; hairs on dorsum of thorax fine and inconspicuous, lateral hairs only being well developed (fig. 23, **b**). *flavicosta*.

43. **Orthopodomyia anopheloides** (Giles), 1903.

Journ. Trop. Med. vi, 315 (*Mansonia*) (♂ & ♀). TYPE-LOC.: Dehra Dun, U.P., India (*Wyville-Thomson*). TYPE: ♂ & ♀ in Brit. Mus.

"*Orthopodomyia nigritarsis* var." Leicester, 1908, Cul. Malaya, p. 177. TYPE-LOC.: "The Dindings," Pangkor Laut, F.M.S. (*Daniels*). TYPE: ♀ in Brit. Mus.

var. *maculata* Theobald 1910, Rec. Ind. Mus. iv, p. 29 (♂). TYPE-LOC.: Maddathorai, Travancore, xi. 1908 (*Annandale*). TYPE: ♂ in Ind. Mus.

var. *maculipes* Theobald 1901, M.C. v, p. 470 (♂ & ♀) (*O. maculipes*). TYPE-LOC.: Andaman Is., vii. 1908 (*Lowis* & *Ray White*). CO-TYPE: ♀♀ in Brit. Mus.

var. n. *andamanensis* (see p. 102). TYPE-LOC.: Andaman Is., viii. 1926 (*G. Covell*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—Medium-sized species, wing 4–6 mm.

♀.—*Head*: dorsal surface thickly covered with large pale-coloured upright forked scales, some narrow yellow scales in front and along eye-margins, a few black and numerous flat white scales at sides; some white scales on torus and on 1st flagellar segment of antenna; palpi rather less than ½ length of proboscis, black or dark brown, with white markings in middle and at tip. Proboscis with a moderately wide white band on apical ½, and usually a white streak on upper surface between the band and tip. *Thorax*: mesonotum covered with narrow pale yellow and white scales, the latter arranged chiefly along sides and over wing-roots, three darker spots forming a triangle posteriorly; in some specimens the most anteriorly situated spot is very small or absent, in others there are several additional dark spots anteriorly. Scutellar scales long, white, and narrow, some on lateral lobes broader. Pleuræ covered for the most part with flat dull white scales, arranged chiefly around the various groups of bristles; scales on upper part of *ppn* narrow and yellow. *Wings* (fig. 2, **a**): veins clothed with black and white scales, latter arranged chiefly in four or five spots along anterior part of wing. Two small spots at base of costa, sometimes confluent; a subbasal spot on *c*, *sc*, and vein 1; a spot at *sc* junction including vein 1; a subapical spot including *c*, 1, and fork of 2; an apical spot including *c*, tip of 1, 2.1, and 2.2. Smaller spots at tips of 3, 4.1, 4.2, and 5.1; also at fork of 4 and on 2, 3, 4, and 5.1 in regions of cross-veins; on 1 and 2 at origin of latter; a small spot at extreme base of 5, with another immediately above it on 1 and *sc*. *Legs*: femora dark brown, speckled with numerous white and pale yellow scales, not arranged in definite spots; a rather wide subapical pale ring not always continued completely round leg, knees narrowly white. Fore and mid-tibiæ sprinkled with pale scales anteriorly, almost entirely yellow posteriorly, except for subbasal and subapical dark rings; hind tibiæ more extensively pale but dark at base; all tibiæ usually white at tips. Fore tarsi dark, with a few pale scales at joints; mid-pair with well-marked narrow basal and apical white rings over joints, segments 4 and 5 mainly pale in some specimens; segment 1 of hind tarsi narrowly pale at base and tip, 2 dark at base, rather narrowly white at tip, 3 and 4 black, with broad basal and narrow apical white rings, 5 entirely white. *Abdomen*: dark brown, tergites II–VII with narrow basal white bands, not always visible in dried specimens, and small apical lateral white spots; a pair of small submedian pale spots in middle of tergites IV–VII. Sternite II almost entirely pale, narrow basal pale bands on III–V.

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* Edwards 1913 *b*, p. 239; 1926 *a*, p. 117 (syn.); 1932, p. 108; Barraud 1927 *a*, p. 527 (syn.).

♂.—Resembles ♀, but antennal plumes dense, hairs long and arranged chiefly on dorsal and ventral aspects, pale yellow in colour; some white scales on inner side of first 4 or 5 flagellar segments. Palpi about ¾ length of proboscis, black-scaled, with white scaling at base and tip and a white ring in middle. Proboscis dark brown or black, with a white ring at about the middle and a white spot dorsally at tip.

Pupa * (fig. 22, **a**).—Distinguished from those of *O. flavithorax* and *O. flavicosta* by the length of the longest hair on tergite VI, this being comparatively short, and usually of 4 branches. The innermost submedian hair on III–VII is very small, whereas in the other two species it is larger and spine-like.

Larva * (fig. 23, **a**).—*Head*, including antenna, deep brown or black, lighter areas on head around eyes. Frontal hair *A* with 9–11 branches; *B* and *d* with 6–8 (the latter well developed), *C* with 4–6; *e* fine and long, often split into two towards tip. Preclypeal spines fairly long, slender and tapering. Antennal shaft about 0·41 mm. long, 4–6 times as long as greatest breadth, stout on rather more than basal ½, tapering to tip; tuft of 6 to 8 branches at ⅓ from base, apical spines all at tip of shaft. *Thorax* with lateral tufted hairs well developed and some long single hairs. *Abdomen* usually reddish in colour; first two segments with lateral tufted hairs, III–VIII with fine hairs, some of which are single and long, VII with a chitinised saddle covering rather more than the dorsal ½ in side view, saddle on VIII nearly enclosing the segment. Comb with 7–10 larger teeth and 25–30 smaller fringed teeth; the largest teeth very long, with main terminal portion of moderate thickness and several long branches on each side which are slightly less stout. *Siphon* dark brown or black, lighter at apex, 1–1·1 mm. long and about 5 times as long as diameter at base; tuft of 8 to 14 strong subplumose branches arising at about middle of tube, but very slightly nearer base than apex. *Anal segment* enclosed in a chitinised ring, a separate chitinised strip on each side at base; *osc* single and long, *isc* split into a number of branches, one much longer than the others; *lh* with 2 or 3 fine branches. Ventral papillæ about ½ length of dorsal, latter rather more than ½ length of anal segment; fan well developed, hairs arising from a fan-plate and each splitting into a number of branches some distance from base.

Habitat.—Tree-holes during the monsoon.

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* Barraud 1932, p. 1015.

DISTRIBUTION.—Fairly common in the WESTERN and EASTERN HIMALAYAS from foothills up to 7,000′ or more; in ASSAM along Brahmaputra Valley and in hills to the south; WESTERN GHATS from north of Bombay to NORTH KANARA (Yellapur).

Not definitely recorded from outside the Indian area, but Leicester's *O. albipes* var. *nigritarsis* from MALAYA is probably this species, as it agrees in the markings of the hind tarsi.

[var. **maculata** Theo.

ADULT.—Differs from typical *O. anopheloides* in the wider white band over joint between 2nd and 3rd hind tarsal segments, white area on 2nd segment occupying $\frac{1}{3}$–$\frac{1}{2}$ its length instead of $\frac{1}{8}$–$\frac{1}{5}$ as in the typical form, and white at base of 3rd segment occupying $\frac{2}{3}$ instead of barely $\frac{1}{2}$ the length of this segment.

LARVA (Javan specimens).—Apparently indistinguishable from typical *anopheloides*.

HABITAT.—Foul water in stumps of giant bamboo and in tree-holes.

DISTRIBUTION.—TRAVANCORE: type-locality, as noted above. CEYLON: Peradeniya, Suduganga. This variety perhaps replaces typical *O. anopheloides* in South India and Ceylon; all the specimens in the British Museum from Ceylon are of this form, as are those from JAVA (Buitenzorg *R. W. Paine*).]

var. **maculipes** Theo.*.

ADULT.—Very similar to typical *O. anopheloides*, but last two hind tarsal segments completely white. Segment 3 of hind tarsi marked with a narrow black subapical ring. Differs from *O. albipes* and *O. anopheloides* var. *andamanensis* in having only two, not three, hind tarsal segments completely white, and from *O. albipes* also in having segment 2 of hind tarsi dark at base.

PUPA.—Unknown.

LARVA †.—Very similar to, if not identical with, that of *O. anopheloides*.

DISTRIBUTION.—I have not seen any specimens agreeing with Theobald's description. It is known only with certainty from the ANDAMANS and SINGAPORE.

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* Theobald appears to have confused two forms under this name. Edwards (1913, p. 239) states that the specimens recorded by Theobald (1910, p. 473) from Ceylon were *O. anopheloides*. The type ♂ mentioned by Theobald, under the same reference, as being in the Indian Museum is not on record there. He was referring most probably, by mistake, to the type ♂ of *O. maculata*, which is there; it is also a specimen of *O. anopheloides*.

† Edwards 1926, p. 118 (Singapore specimens).

var. n. **andamanensis.**

ADULT.—Differs from typical *O. anopheloides* as follows :—Segment 2 of hind tarsi only very narrowly white at tip, 3–5 entirely white. Proboscis of ♀ with a wider pale band. Proboscis of ♂ nearly all yellow on apical ⅓. Differs from *O. albipes* in having definite apical and basal banding on fore and mid-tarsi.

PUPA and LARVA.—Unknown. Until these have been discovered it is not possible to say whether this is a variety of *O. anopheloides* or of some other species, or possibly distinct.

DISTRIBUTION.—ANDAMAN IS. *, as above, also ix. 1911 (*Christophers*). One ♂ from Sukna *, DARJEELING DIST., viii. 1928 (*Sobha Ram*), is of this form. This was collected at the same time and place as typical *O. anopheloides* and *O. albipes*. SINGAPORE (*Given*), 1 ♂, 1 ♀ in Brit. Mus., in company with var. *maculipes*.

44. **Orthopodomyia albipes**, Leicester in Theobald, 1904.

Entom. xxxvii, p. 237 ; Cul. Malaya, p. 176, 1908. TYPE-LOC. : Kuala Lumpur, F.M.S. (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.

? *Kerteszia mcgregori* Banks, 1909, Phil. J. Sci. A, iv, p. 548. TYPE-LOC. : Philippine Is.

ADULT.—Resembles *O. anopheloides* except as follows :—Segment 2 of hind tarsi narrowly white at base and usually very narrowly so at tip †, segments 3–5 entirely white. Pale markings on fore and mid-tarsi mainly basal and segment 5 mainly pale. Proboscis of ♀ with a wider pale band ; palpi of ♀ with narrow white band in middle and narrow apical and subapical white markings close together. Proboscis of ♂ with large creamy subapical area nearly surrounding the organ.

[LARVA ‡.—A Malayan specimen (not isolated) in the British Museum differs from *O. anopheloides* in having the head pale, antennæ longer (8 times as long as their greatest breadth), and the larger comb-teeth without long lateral branches, but with a fine fringe of short hairs only, leaving the distal ⅓ bare ; siphon rather longer and more pointed.]

HABITAT.—Bamboos (*Leicester*).

DISTRIBUTION.—Known in India only from Sukna, DARJEELING DIST., 500′, viii. 1928 (*Sobha Ram*) ; 3 ♀♀, 1 ♂, taken in company with *O. anopheloides*.

Outside India known from MALAY PENINSULA, BORNEO, and PHILIPPINE IS.

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† [Often, but by no means always, without any white scales at tip in Malayan specimens.]

‡ Edwards 1926, p. 118.

45. **Orthopodomyia flavithorax** Barraud, 1927 *.

Ind. Journ. Med. Res. xiv, p. 529 (♂ & ♀). TYPE-LOC.: Karwar, N. Kanara dist., ix. 1921 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—Differs from *O. anopheloides* as follows:—Mesonotal scales bright yellow or golden; wings without the subbasal and subapical white spots on *c*, etc.; white markings on mid-tarsi at bases of segments only; pale scales on femora and tibiæ arranged in definite spots; palpi of ♂ as long as proboscis; white scales on 1st flagellar segment only of antenna of ♂; proboscis of ♂ with a white marking on upper side rather beyond the middle, and usually another marking on underside nearer tip, the two markings sometimes forming nearly a complete band; another white marking on upper side near tip; proboscis of ♀ with a white band and yellow spots, variable in extent; sometimes the whole organ is strongly spotted with yellow, the white band being obliterated.

A rather variable species. Frequently in the ♀ there is a white spot on the stem of vein 5 at the fork. This spot is present in the ♂♂, including the type.

PUPA † (fig. 22 **c**).—One of the sublateral hairs on tergites IV–VI very long, these long hairs on IV and V with 3 branches, VI 2-branched. (In *O. anopheloides* the corresponding hair on VI is comparatively short and usually 4-branched; in *O. flavicosta* it is long and simple, as are also the longest hairs on IV and V.)

LARVA † (fig. 23 **c**).—This has a very characteristic appearance, even to the naked eye, owing to the remarkable development of the hairs on the head and thorax. Hairs *A*, *B*, *C*, *d*, and *e* on the clypeus are all about equally developed and each has a number of subplumose branches which are as long as, or longer than, the clypeus. Antennal shaft about 0·58 mm. long, about 6 times as long as greatest breadth, stout on basal ⅓, much more slender apically, brown for the most part, paler at tip; tuft of about 5 subplumose branches, arising at about ¼ from base; apical bristles all very near tip of shaft. Preclypeal spines long, slender, tapering. *Thorax* densely clothed dorsally and laterally with long tufted hairs with subplumose branches. *Abdominal* segments with some very long single or 2-branched hairs, as well as shorter tufted hairs with subplumose branches;

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* [*O. arboricollis* d'Emm. (endemic in Mauritius) shows much resemblance to *O. flavithorax*, but has all the wing-scales larger and broader, with many scattered white scales in addition to those forming definite spots; femora and tibiæ heavily sprinkled with pale scales which are not aggregated into spots; no scattered pale scales on tarsi; 4th hind tarsal segment black; abdominal tergites basally banded.]

† Barraud 1932, p. 1015.

VII without a chitinised saddle ; VIII with indefinite chitinisation not forming a definite saddle. Comb with 10–12 comparatively very large pointed teeth and 18 to 20 smaller delicately fringed teeth. *Siphon* 1·4–1·5 mm. long and 5–6 times length of diameter at base, dark brown, a very narrow darker ring at base, paler at extreme tip ; tuft of about 8 finely frayed branches, arising at about ⅖ the length from base. *Anal segment* enclosed in a chitinous ring, no separate chitinisation at base ; *osc* single and long, 6 or 7 times length of chitinised part of segment ; *isc* split into a number of branches all about same length and about 2½ times length of segment ; ventral papillæ about ½ length of dorsal pair, latter only about ½ length of segment ; *lh* of 2 or 3 fine branches ; fan well developed, about 14 hairs arising from fan-plate, each hair split some distance from base into a number of fine branches.

HABITAT.—Tree-holes during the monsoon.

DISTRIBUTION.—S.W. INDIA : Malabar Coast *, x. 1915 (*Khazan Chand*) ; Karwar * and Kadra *, N. Kanara, ix. 1921 (*Barraud*). CEYLON : Madola, near Opanayaka, ii. 1933 (*Henry*).

46. **Orthopodomyia flavicosta** Barraud, 1927.

Ind. Journ. Med. Res. xiv, p. 531 (♂ & ♀). TYPE-LOC. : Karwar, N. Kanara dist., ix. 1921 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—Very similar to *O. flavithorax*, described above, and differs from *O. anopheloides* in very similar details. From *O. flavithorax* it differs in the browner scales, in markings of proboscis, and in having only one small spot at base of costa, or none, the basal ½ of that vein being thickly sprinkled with yellow scales, which may be so numerous as to form a streak. Proboscis in ♀ with a small white spot on upper side and usually some pale scaling on underside nearer to base (not nearer to tip, as in *O. flavithorax*) ; in the ♂ the white band is produced on underside for some distance towards tip. Palpi of ♂ as long as proboscis, and pale scales on femora and tibiæ arranged in definite spots in both sexes, as in *O. flavithorax*.

PUPA † (fig. 12).—Very similar to *O. flavithorax*, but longest sublateral hairs on tergites IV–VI single.

LARVA † (fig. 23 b).—Differs in several respects from that of *O. flavithorax*, with which it is found breeding in association, the hairs on the head and thorax being much less developed, and the larger comb-teeth being of different form. *Head* yellowish, slightly darker posteriorly. Antennal shaft about 0·5 mm. long, tapering from base to apex, comparatively slender, about 11 times as long as greatest breadth,

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† Barraud 1932, p. 1016.

paler on apical part than towards base; tuft of about 6 branches, arising at a point between ¼ and ⅓ length of shaft from base. Frontal hair *A* usually of 9 branches (variation 9 to 12); *B* of 6 or 7 branches; *C* of 4 or 5; *d* of 3 or 4 fine branches much shorter than *B* or *C*; *e* fine and usually single, but may be split into 2 towards the tip. Preclypeal spines fairly long and tapering, pale in colour. *Thorax* with lateral tufted hairs well developed, but hairs on dorsum fine and inconspicuous. First two *abdominal* segments with lateral tufted hairs, following segments with fine hairs, some of which are long and single as usual; VII without a chitinised saddle: VIII with a definite saddle nearly enclosing the segment. Comb with 7 to 10 larger teeth and about 20 smaller fringed teeth; the larger teeth end in a number of sharp points and resemble a hand, there being usually 5 flattened leaf-like points. *Siphon* 1·2 mm. long, 5 or 6 times length of diameter at base, tuft of about 6 branches, finer than in the other three species here described, arising very slightly nearer base than apex of tube. Anal segment very similar to that of *O. flavithorax*.

HABITAT.—Tree-holes during the monsoon.

DISTRIBUTION.—S.W. INDIA only: Karwar and Kadra, North Kanara, ix. 1921 (*Barraud*).

Genus **FICALBIA** Theobald, 1903.

M.C. iii, p. 296. Genotype, *F. minima* Theo.

Mimomyia Theobald, 1903, M.C. iii, p. 304. Genotype, *M. splendens* Theo.

Etorleptiomyia Theobald, 1904, 1st Rept. Wellc. Lab. p. 71. Genotype, *E. mediolineata* Theo.

O'Reillia Ludlow, 1905, Can. Ent. xxxvii, p. 101. Genotype, *O'R. luzonensis* Ludl.

Ludlowia Theobald, 1907, M.C. iv, p. 193. Genotype, *L. chamberlaini* (Ludl.).

Radioculex Theobald, 1908, Rec. Ind. Mus. ii, p. 295. Genotype, *R. clavipalpus* Theo.

Dasymyia Leicester, 1908, Cul. Malaya, p. 102. Genotype, *D. fusca* Leic.

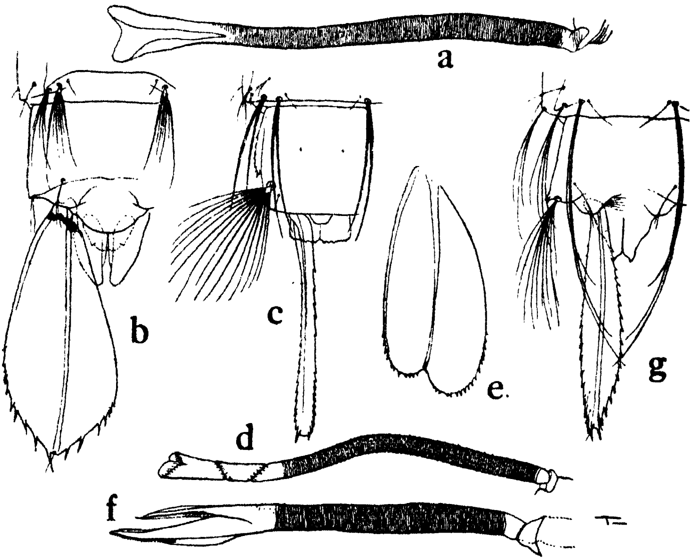
Conopomyia id., ib. p. 113. Genotype, *C. metallica* Leic.

Etorilepidomyia Alcock 1911 (emend.), Ann. & Mag. Nat. Hist. (8) viii, p. 249.

This genus has recently been extended to include *Mimomyia* Theo., which was formerly classed separately. As regards the Indian region, five species are known, representing three different subgenera. These might reasonably be regarded as of generic rank, but this is a matter of opinion, and it seems inadvisable to change the classification again at present. The characters of the subgenera are indicated in the key on pp. 107–8.

Adult *.—Small, or rather small, mosquitoes; antennæ about length of proboscis; proboscis of ♂ distinctly widened towards tip; palpi of ♂ not more than about ¼ length of proboscis; *apn* well separated; no spiracular or postspiracular bristles, one lower mesepimeral or none, several strong *ppn*, other groups of bristles fairly well developed. Pleuræ not very scaly. Segment 1 of hind tarsi shorter than tibia, segment 4 of all tarsi of ♀ as long as, or longer than, 5; no pulvilli; claws of ♀ simple, fore and mid-claws of ♂ unequal and toothed. Vein 6 terminating nearer apex of wing than level of fork of 5, squama with complete fringe. Hypopygium of ♂ of simple structure; coxite fairly long, with a bristly basal lobe on inner side. Style long, tapering, with terminal appendage. Phallosome thinly chitinised and tube-like, without lateral plates or teeth. Paraprocts with several small teeth at crown. Ninth tergite with median lobe bearing hairs on each side. Hypopygium of ♀ with one to

Fig. 24.



Pupal charcters (respiratory horn and tip of abdomen or paddle) of *Ficalbia*: a, b, *chamberlaini*; c, d, *fusca*; e, f, *hybrida*; g, *luzonensis*.

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* Edwards 1932, p. 108. See also Macfie & Ingram 1922, p. 182 (hypopygium); Barraud 1929 *a*, pp. 1054–6.

three spermathecæ, according to species; segment VIII short and broad, cerci short.

PUPA (fig. 24).—Respiratory horns remarkably long and narrow, resembling long thin tubes with opening at extremity (in the aberrant species *F. hybrida* (Leic.) the apical part of the horn is modified for piercing tissues of plants and divided into leaflets). Dendritic tufts on abd. seg. I not well developed or absent. Paddles rather narrow or very narrow, with serrations or spines along margins, at least towards apex, usually no terminal hair. When the pupa is resting at the surface the respiratory horns are held forwards and the paddles flexed towards the dorsum of the abdomen.

LARVA, 4th stage (figs. 25–27).—The different species exhibit great diversity of form, but the following characters are common to the Indian species:—Head large, broader than long; antenna with large tuft and with subapical hairs some distance from apex. Pleural plates of meso- and metathorax large, usually bearing a long spine. Abd. seg. VIII without a lateral plate, but with a varying number of usually simple teeth. Siphon 4–6 times length of diameter at base, with few simple pecten-teeth or none; one pair of hair-tufts some distance from base with few branches. Anal segment with complete chitinous ring and with moderately developed fan but no fan-plate, lateral hair usually long; both pairs of subdorsal hairs usually of several branches.

EGGS.—Unknown.

DISTRIBUTION and BIONOMICS.—Found chiefly in the southern and eastern parts of the Indian region; the species are not common, and little is known of their habits; they do not appear to attack man. The genus is represented in Africa, and extends through the Oriental region to Australia. So far as is known, the larvæ live in large permanent pools containing much vegetation, or in fallow rice-fields.

Key to Adults (species and subgenera).

1. Fork-cells short, *af* only about ½ length of stem; palpi of ♂ slightly longer than proboscis, last segment thickened; 3 chitinised spermathecæ in abdomen of ♀ (subgenus *Mimomyia*)	2.
Fork-cells not shortened, *af* as long as, or longer than, stem; palpi of ♂ shorter than proboscis and slender; 1 chitinised spermatheca in abdomen of ♀	3.
2. Mesonotum with conspicuous yellow scaling laterally; tarsi with yellow rings; segment 5 of hind tarsi entirely yellow	*chamberlaini*, p. 108.
Mesonotum without conspicuous yellow scaling; tarsi not ringed; segment 5 of hind tarsi dark	*hybrida*, p. 111.

3. Palpi of ♂ about ⅔–¾ as long as proboscis; 1st flagellar segment of antenna of ♀ not much longer than 2nd (subgenus *Etorleptiomyia*) .... 4.
  Palpi of ♂ only about ⅛ as long as proboscis (fig. 27, **h**); 1st flagellar segment of antenna of ♀ about 3 times as long as 2nd (fig. 27, **g**) (subgenus *Ficalbia*) ...... 5.
4. Wings speckled with light and dark broad scales; tarsi mainly yellow, spotted with black; abdomen pale, with median dorsal dark stripe .... *luzonensis*, p. 113.
  Wings not speckled, scales all dark and less broad; tarsi mainly dark, but pale beneath; dorsum of abdomen dark ..... *fusca*, p. 115.
5. Tarsi with narrow pale rings, most distinct on hind legs; dorsum of abdomen with transverse pale bands .... *minima*, p. 116.

Key to Larvæ (4th stage).

1. Maxilla with a strong black apical spine resembling clypeal spines; 1–3 stout pecten-teeth on siphon .... 2.
  Maxilla without apical spine; no pecten-teeth on siphon (subgenus *Etorleptiomyia*). 4.
2. Antennal tuft near middle; clypeal spines simple; siphonal tuft near middle (subgenus *Mimomyia*) .... 3.
  Antennal tuft far beyond middle; clypeal spines barbed; siphonal tuft near base (subgenus *Ficalbia*) .... *minima*.
3. Siphon of moderate length and normal shape, valves large, one pair each with a long, fine hair .... *chamberlaini*.
  Siphon very short, broad at base but very narrow at tip; valves very small, without long hairs .... *hybrida*.
4. Subapical hairs of antenna simple; mentum with central tooth; comb-teeth in a regular row .... *luzonensis*.
  Subapical hairs of antenna dendritic; mentum without central tooth; comb-teeth in a patch .... *fusca*.

47. **Ficalbia (Mimomyia) chamberlaini** (Ludlow), 1904.

Can. Ent. xxxvi, p. 297 (*Mimomyia*) (♂). TYPE-LOC.: Bayamban, Luzon, P.I., v. 1904 (*Chamberlain*). TYPE: ♂ in U.S. Nat. Mus.

Radioculex clavipalpus Theobald, 1908, Rec. Ind. Mus. ii, p. 295 (♂ & ♀): TYPE-LOC.: Calcutta, xi.–xii. 1907 (*Mus. collr.*). TYPE ♂ & ♀ in Ind. Mus.

var. *intermedia* Barraud, 1929, Ind. Journ. Med. Res. xvi. p. 1055 (♂ & ♀). TYPE-LOC.: Gauhati, Kamrup dist., Assam, iv. 1927 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—Easily identified by the markings. The only other Indian mosquito with which it could be confused is *Aëdes* (*Banksinella*) *lineatopennis* (Ludl.), which has a similar ornamentation of the mesonotum but entirely dark tarsi *. Wing about 2·7 mm.

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* Theobald 1907, p. 194 (*Ludlowia*); Edwards 1911, p. 244 (syn.); Dyar & Shannon 1925, p. 82; Barraud 1929 *a*, p. 1055.

♀.—*Head*: dorsal surface covered with flat scales, usually appearing dull ochre-yellow, with a darker patch on either side towards front; in some specimens the scales appear mainly dark; some very small dark upright scales on nape. Antennæ and clypeus dark brown. Palpi dark brown at base, a little lighter in middle and at tips; about ¼ length of proboscis. Proboscis rather long, about length of abdomen, distinctly swollen apically in side view, dark bronzy brown, underside paler. *Thorax*: integument of mesonotum shining brownish-black, with narrow scales and bristles of same colour; a large well-defined patch of bright yellow scales over, and in front of, each wing-root. Scutellar scales narrow and dark brown. Postnotum dark brown, sides paler. Integument of pleuræ uniformly pale. *Wings*: dark scaled, fork-cells short, *af* much shorter than its stem. *Legs*: fore femur yellowish with bronzy sheen, darker apically; mid- and hind femora bronzy brown, paler on posterior surfaces. Tibiæ and tarsi with dark violet, bronzy, or brassy sheen, hind tibiæ pale at tips; narrow yellow markings at bases of segments 2 and 3 of tarsi of fore and mid-legs; similar, but more pronounced, markings on joints between tarsal segments of hind legs; segment 5 entirely pale. *Abdomen*: dorsum entirely covered with dark scales having a violet sheen, venter pale yellowish.

♂.—Antennal shaft yellow, plume-hairs brown and dense. Palpi slightly longer than proboscis, yellow, with a dark ring at joint between last two segments and a dark marking at tip of last segment, which is swollen. Proboscis yellow, with dark tip, widened on apical ⅓. Other markings as in ♀.

var. *intermedia* Barraud differs in having large lateral yellow patches on abdominal tergites, uniting in some specimens to form basal bands. This form appears to agree closely with Miss Ludlow's original description. It is possible that this form, which occurs in Assam (and presumably in the Philippines), may be specifically distinct from the *clavipalpus* form described from Calcutta. The larva of the variety has not yet been obtained.

PUPA (fig. 24, a, b).—Respiratory horns very long, slightly expanded at apices; a small dendritic tuft on I, paddles wider than in *F. luzonensis* and *F. fusca*, brownish, with pale area on outer side and strong spines along apical margins.

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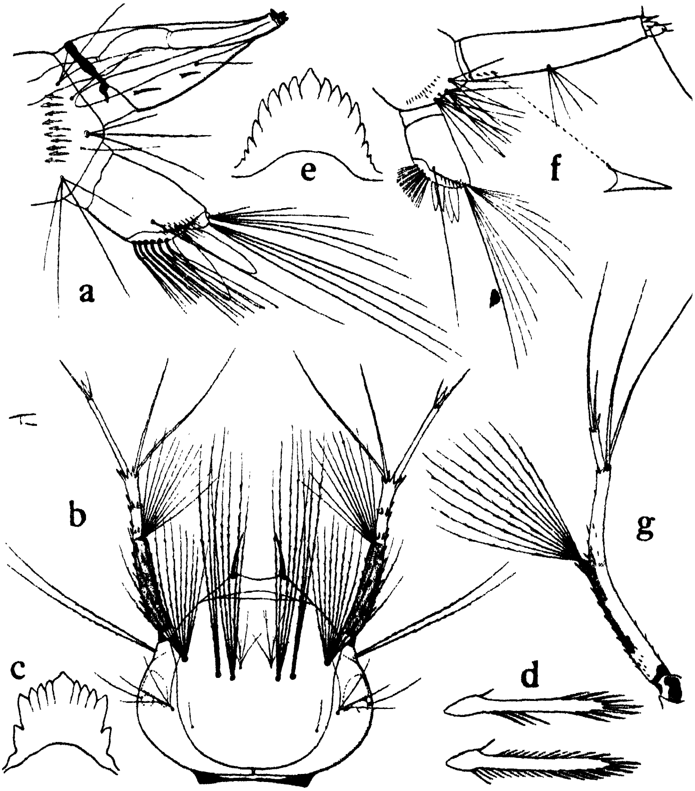
* [Two other Oriental species are nearly related to *F. chamberlaini*: (1) *F. metallica* Leic. (Malay Penin. and Queensland), which differs in having a more or less continuous median yellow abdominal stripe; and (2) *F. aurea* Leic. (Malay Penin. and Borneo), which lacks the yellow borders to mesonotum and has the abdomen distinctly banded.]

LARVA * (fig. 25, **e–g**).—*Head* rather large, dark brown or black. Antennal shaft long, very dark on basal ¾, with strong spinelets along its length ; tuft at about middle point composed of a number of plumose branches, subapical bristles long and placed some distance below tip, one long and one shorter apical bristle. Frontal hair *A* with a number of densely plumose branches, *B* with 2–4 long plumose branches, *C* with 6–8 ; *d* rather small, with about 5 fine branches ; *e* fine and usually split into two some distance from base. Hair *d*

Fig. 25.



Larval characters of *Ficalbia*, subgenus *Mimomyia* : **a–d**, *hybrida* ; **e–g**, *chamberlaini*. (**d**, comb-teeth.)

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* Barraud 1923 *h*, p. 504. See also Edwards & Given 1928, p. 349.

almost level with *B*, *C* slightly posterior to both; all three fairly close together. A very long 2-branched hair ventrally on head near base of antenna. Preclypeal spines long and black. Mouth-brushes fairly large, hairs simple. Lateral hairs on *thorax* well developed, arising from chitinised tubercles having small thorn-like processes. Some of the hairs very long, reaching forwards as far as tip of antenna. *Abdominal* hairs fairly long, especially lateral series on first two or three segments. Comb of 10–16 small fringed teeth, majority in one row, but two, usually separate from main rank, towards posterior border of segment. *Siphon* comparatively short, slightly curved forwards towards tip, 4–5 times length of diameter at base, tufts of about 4 branches, towards posterior border, at about middle of tube. Pecten of 1–3 strong simple teeth at base of tube. Acus small. Valves normal, but one pair with a very long fine hair about ½ length of siphon. Anal segment enclosed in chitinous ring, much narrower ventrally than dorsally, posterior border spiny; *lh* very long and subplumose; *osc* and *isc* with a number of branches. Both pairs of papillæ rather short and pointed; fan moderate, no fan-plate.

HABITAT.—Pools and ponds, especially those containing much vegetation.

DISTRIBUTION.—From the PUNJAB to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON, but seldom abundant.

Apart from the PHILIPPINE ISLANDS, it has not been recorded from elsewhere.

48. **Ficalbia (Mimomyia) hybrida** (Leicester), 1908 *.

Cul. Malaya, p. 115 (♂ & ♀) (*Conopomyia*). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*) (♂); Singapore (*Finlayson*) (♀). TYPE: ♂ & ♀ in Brit. Mus.

Ludlowia minima Ludlow, 1907, Can. Ent. xxxix, p. 413 (♂ & ♀). TYPE-LOC.: Carandaugan, P.I., i. 1906 (*Duncan*). TYPE: ♂ & ♀ in U.S. Nat. Mus.

Ficalbia ludlowi Brunetti, 1920, p. 173 (nom. nov. for *L. mimima* Ludl.).

No. 1. *Undetermined sp.* Leicester, 1908, Cul. Malaya, p. 260 (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT †.—A rather small, obscure species, sometimes mistaken for *Uranotænia* on account of the short anterior fork-cell, but distinct on generic characters. Wing about 3 mm.

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* Owing to the inclusion of *Mimomyia* in *Ficalbia*, the name of this species is now *hybrida*. It has been referred to previously by most writers as *M. minima* (Ludl.).

† Theobald 1910 *b*, p. 191; Edwards 1922 *d*, p. 468 (syn.); Barraud 1929 *a*, p. 1054; Bonne-Wepster 1932, p. 69.

♀.—*Head*: dorsal surface covered with flat greyish or yellowish scales, some very small black upright scales on nape. Antennæ, clypeus, and palpi brown; palpi about $\frac{1}{4}$ length of proboscis; 1st flagellar segment of antenna fully twice length of 2nd. Proboscis brown, darker on apical $\frac{1}{3}$, which is distinctly swollen. *Thorax*: mesonotal scales dark brown. Postnotum almost black. Integument of pleuræ pale brown. *Wings*: scales dark and moderately broad, fork-cells quite short. *Legs*: dark brown, femora lighter, tibiæ and tarsi with pale yellowish sheen when seen in certain positions, tibial bristles distinctly long. *Abdomen*: dorsum almost black, with narrow basal pale yellow bands widening out at lateral margins of tergites. Sternites pale yellow.

♂.—Markings as in ♀. Antennal plumes dense, pale brown. Palpi slightly longer than proboscis, deep brown, with some mottling of paler scales; last segment swollen, rather hairy, and very dark in colour.

[PUPA * (fig. 24, **e**, **f**).—Respiratory horns long, basal $\frac{3}{5}$ annular, distal $\frac{2}{5}$ smooth, modified for piercing by being deeply split at tip into two spine-like portions. Dendritic tuft on I small. Paddles moderately broad, wholly dark; with short, sharp spines along apical margins, deeply emarginate at tip, without terminal hair.

LARVA *† (fig. 25, **a**–**d**).—*Antennæ* long, with a dark ring at base, otherwise pale; strong spinules extending as far as subapical hairs, which are long; tuft just before middle of antenna; portion beyond subapical hairs very long and slender; apical hairs both short. *Frontal hairs A, B,* and *C* long, with about 12, 3, and 5 branches respectively; *d* short, with about 5 branches; *e* single. Preclypeal spines long and black; similar spines present on maxillæ as in other species of this subgenus. *Comb* of about 10 finely fringed teeth in a fairly regular row. *Siphon* short, conical, its distal $\frac{1}{4}$ very narrow, with remarkably small valves which do not bear any obvious hairs, a single fine hair at mid-length representing the tuft; 2 strong, simple pecten-teeth. Anal segment much as in *F. chamberlaini*.

HABITAT.—Among *Pistia* in a fresh-water pond together with *Mansonia uniformis*. The larvæ presumably insert the narrow tip of the siphon into the *Pistia* roots to obtain air;

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* Bonne-Wepster 1932, p. 71; re-described above from Javan specimens presented to the British Museum by Mrs. Bonne.

† [The larva recorded by Edwards and Given (1928, p. 349) as possibly "*M. minima* (Leic.)," i. e., *minima* Ludl.=*hybrida* Leic., proves, on re-examination, to be that of *F. luzonensis*.]

the whole siphon is similar in shape to that of *Mansonia*, although the valves are not specially modified as in that genus.]

DISTRIBUTION.—ASSAM : Gauhati *, Kamrup dist., iii. 1925 (*Barraud*) ; Golaghat *, Sibsagar dist., v. 1925 (*Barraud*). BENGAL : Dacca *, xii. 1911 (*S. K. S.*) ; Santragachi *, Howrah, viii. 1926 (*Senior-White*) ; Garden Reach *, Calcutta, xi. & xii. 1930 & 1931, and viii. 1931 (*Senior-White*). BIHAR : Kierpur (*Paiva*).

Known also from MALAYA and PHILIPPINES.

49. **Ficalbia (Etorleptiomyia) luzonensis** (Ludlow), 1905.

Can. Ent. xxxvii, p. 101 (♀) (*O'Reillia*). TYPE-LOC. : Bayambang, Luzon, P.I., ix. 1904 (*Chamberlain*). TYPE : ♀ in U.S. Nat. Mus.

Etorleptiomyia completiva Leicester, 1908, Cul. Malaya, p. 178 (♂). TYPE-LOC. : Singapore (*Finlayson*). TYPE : ♂ in Brit. Mus.

ADULT †.—Very distinct by colouring of wings and tarsi and the median black stripe on abdomen ‡. Wing about 2·4 mm.

♀.—*Head* : dorsal surface covered with narrow white scales and white-tipped upright scales, latter chiefly towards nape ; some deep brown flat scales at sides. Tori deep brown speckled with pale scales, flagellum of antenna brown. Clypeus deep brown with pale sheen. Palpi about $\frac{1}{6}$ length of proboscis, black, with white-scaled tips. Proboscis black at base, remainder yellow, speckled with black scales, labella light ; apical $\frac{1}{3}$ of proboscis slightly enlarged. *Thorax* : mesonotum covered with black and pale yellow or white narrow scales, latter arranged chiefly in a broad median band and in patches towards wing-roots. Scutellar scales black and light brown intermixed, all fairly broad. Postnotum dark brown, lighter in middle and at sides. Integument of pleuræ black anteriorly, posterior part of sternopleura and mesepimeron very light. *Wings* : speckled with pale yellow and black broad scales, many of which are asymmetrical ; forks long, especially *af*. *Legs* : femora dark on anterior surface, speckled with pale scales, paler posteriorly. Tibiæ speckled with black and pale yellowish scales. Tarsi yellow, with black markings ; segment 1 on all legs with strong speckling of black scales in middle and usually a dark subapical ring, remainder yellow ; segment 2 yellow, with subbasal and subapical dark rings; 3, 4, and 5 usually with a single medial dark ring. *Abdomen*: dorsum with a median dark stripe running whole length, pale yellow scales laterally; the pale areas often speckled with black scales. Sternites mainly pale yellow.

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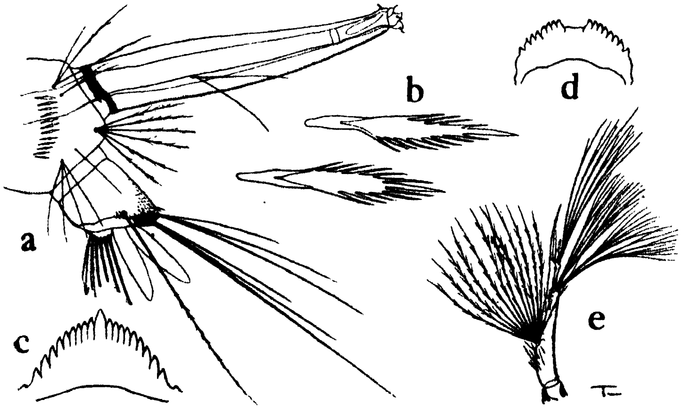
† Theobald 1907, p. 507 ; Edwards 1913 *b*, p. 238 (syn.) ; Barraud 1929 *a*, p. 1057.

‡ [The only nearly related Oriental species, *F. elegans* Taylor (Queensland and Sumatra), differs in having abdomen all dark above and hind tarsi dark, with yellow rings over joints. The African *F. mediolineata* has a median *pale* line on the abdomen.]

♂.—Markings as in ♀. Antennæ with dense plumes of brown hairs, arranged chiefly on two sides. Palpi slender, $\frac{3}{4}$ length of proboscis, slightly swollen at tip, actual tip white, part immediately behind this black. Proboscis considerably swollen on apical $\frac{1}{2}$.

[PUPA * (fig. 24, **a**, **b**).—Respiratory horns extremely long, with annular thickening, except on the distal 6th, which is smooth and with slit-like opening, but not split as in *F. hybrida*. No dendritic tuft on I. Lateral and sublateral hairs on II–VII very long and branched; sublateral pair on VII extremely long; lateral hair on VIII large, 8–10 branched. Paddles very long and narrow, with a dark spot at the tip, otherwise pale; short stout spines along both outer and inner edges, but stronger on outer; a fine terminal hair in a slight notch.

Fig. 26.



Larval characters of *Ficalbia*, subgenus *Etorleptiomyia*: **a**–**c**, *luzonensis*; **d**, **e**, *fusca*.

LARVA * (fig. 26, **a**–**c**).—*Antennæ* long, entirely pale, shaft spicular; a large tuft at middle; subapical hairs long, simple, portion of antenna beyond them only $\frac{1}{2}$ as long as middle section; one of the two apical hairs long, almost equalling

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* [Senior-White 1925, p. 220. Redescribed above from specimens from Ceylon (*Senior-White*) and Hong Kong (*Dr. R. B. Jackson*).]

the subapical pair. *Frontal hairs* much as in *F. hybrida*. Preclypeal spines long and moderately stout, not blackened, but with a strong barb on each side near base; no spines on maxillæ. Meso- and metapleural plates each with a long spine. *Comb* of 10–12 teeth in one regular row. *Siphon* long and narrow, slightly widened before middle and considerably narrowed on distal ¼, when flattened appearing rather strongly curved; no pecten; a bifid hair at ⅓. Anal segment very short; lateral hair long and single, as in *F. chamberlaini* and *F. hybrida*; very few hairs in fan.

HABITAT.—Not definitely recorded, but presumably weedy ponds on swamps with *Pistia*, as in the case of the allied African species.]

DISTRIBUTION.—BENGAL: Calcutta *, x. 1910, 1 ♂ (*Sharma*); Garden Reach *, viii. 1931, 1 ♂ (*Senior-White*); U.P.: Saharanpur *, ix. 1927, 1 ♀ (*Sinton*). CEYLON: Colombo *, 1913 (*James*); Kaikawala village, Matale dist., larva of 1 ♀ (*Senior-White*).

Also known from MALAYA, BORNEO, SIAM, TONKIN, PHILIPPINE IS., and HONG KONG.

50. **Ficalbia (Etorleptiomyia) fusca** (Leicester), 1908.

Cul. Malaya, p. 102 (♂ & ♀) (*Dasymyia*). TYPE-LOC.: Malay Penin., five miles from Kuala Lumpur (♂), Bukit Kutu (♀) (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Small, obscure, dark species. Wing about 2 mm.

♀.—*Head*: dorsal surface covered with flat dark purplish scales; a small patch of silvery scales on vertex and a narrow silvery line along eye-margins, a few small dark upright scales on nape. Antennæ dark brown, some silvery white scales on inner surface of torus. Clypeus, palpi, and proboscis brownish-black; palpi about ⅕ length of proboscis, the latter slightly swollen on apical ¼. *Thorax*: mesonotal scales dark brown, bristles very long and numerous. Scutellar scales flat, small, and dark brown. Pleuræ dark brown, with small patches of silvery scales. *Wings*: scales comparatively large, dark in colour, many asymmetrical, as in *Mansonia*; fork-cells moderately long. *Legs*: dark brown, femora paler beneath; last two segments of hind tarsi distinctly pale, but not white. *Abdomen*: dorsum deep brown, with purplish sheen, small basal white lateral spots. Sternites pale yellowish.

♂.—Antennæ plumose, hairs dark brown. Palpi ⅜ length of proboscis, very slender, and without hair-tufts. Proboscis much enlarged on apical ⅓. Other details as in ♀.

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† Edwards 1928 *b*, p. 57; Barraud 1929 *a*, p. 1057.

[PUPA † (fig. 24, **c**, **d**).—Respiratory horns extremely long and slender, basal ⅘ blackened and densely covered with minute spicules (a unique feature of this species); distal ⅕ bare and showing two false joints; below the horn a long bristle, and behind and above it a shorter stout spine-like bristle. No dentritic tuft on I; sublateral hair on VII not longer than on VI; lateral hair on VIII very large, with 12 or more branches. Paddles entirely pale, similar in form to *F. luzonensis*, but still narrower, almost linear.

LARVA † (fig. 26, **d**, **e**).—*Antennæ* moderately long, pale; shaft with a few fine hairs but no spicules; tuft very large and well before middle; subapical hairs very long and branched in a dendritic manner, one of the apical hairs similar. *Frontal hairs A*, *B*, and *C* very large, plumose, *A* and *C* with about 25 branches, *B* with about 12. Preclypeal spines long, rather slender, simple; apical spine of maxilla short and weak. Mentum small and without median tooth. Mesopleural plate rather small, without spine; metapleural large, with 2 short spines. Comb-teeth about 30, in a triangular patch, those towards the base small. *Siphon* long and rather slender, not at all widened before middle, slightly narrowed and curved forwards on distal ⅕; a bifid hair at ⅓. Anal segment much as in *F. luzonensis*; *lh* may be double.

HABITAT.—" Rot-hole in forest tree at ground-level, associated with *Heizmannia funerea*; the water was muddy, apparently from storm water."]

DISTRIBUTION.—Only one ♂ known from Indian region: ANDAMAN IS. *, ix. 1911 (*Christophers*). The specimen agrees exactly with Leicester's description.

Also known from MALAYA.

51. **Ficalbia (Ficalbia) minima** (Theobald), 1901.

M.C. ii, p. 262 (*Uranotænia*) (♂). TYPE-LOC.: Quilon, Travancore, iii. 1900 (*James*). TYPE: 2 co-type ♂♂ in Brit. Mus.

Mimomyia minuta Theobald, 1908, Rec. Ind. Mus. ii, p. 301 (♂). TYPE-LOC.: Sylhet, Assam, xi. 1904 (*Hall*). TYPE: ♂ in Ind. Mus. Theobald, *ib.* 1910, iv, p. 30 (♀). TYPE-LOC.: Calcutta, vii. 1907 (*N. Annandale*). ALLOTYPE: ♀ in Ind. Mus.

ADULT ‡.—A small species which might be mistaken for a *Uranotænia*, but distinct on generic and subgeneric characters. Wing barely 2 mm.

♀.—*Head*: clothed for the most part with flat creamy scales (in some specimens appearing darker), some black

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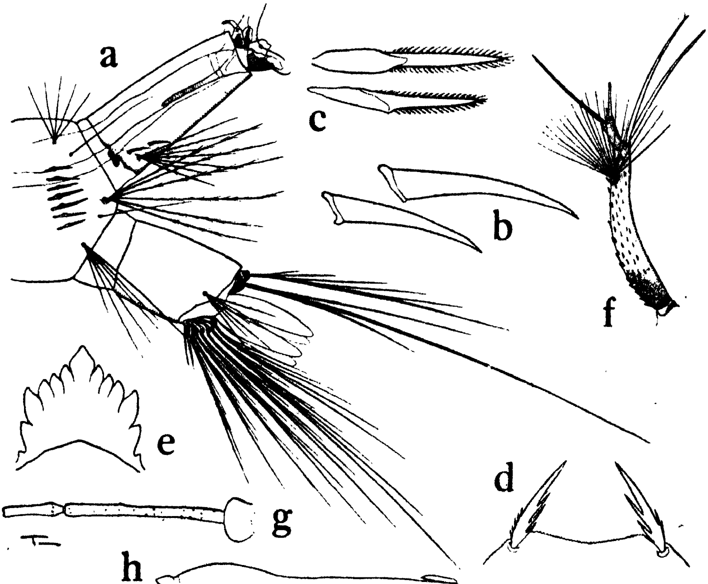
† [Edwards & Given 1928, p. 349. Redescribed above from the Singapore material.]

‡ Theobald 1903 *a*, p. 297; Edwards 1913 *b*, p. 238; Barraud 1929 *a*, p. 1057.

upright scales on nape. Antennæ and proboscis brown, latter slightly enlarged towards tip, 1st flagellar segment long (fig. 27, **g**). Proboscis as long as, or longer than, abdomen. Palpi very short, hardly exceeding clypeus. *Thorax*: integument of mesonotum shining dark bluish, few dark scales, fairly numerous long black bristles. Postnotum deep brown. Pleuræ pale brown, with several small darker areas anteriorly. *Wings*: veins clothed with broad dark scales, both forks fairly long. *Legs*: femora mainly pale yellow, darker dorsally on apical $\frac{1}{2}$, knees of mid- and hind pair narrowly silvery.

Fig. 27.



Ficalbia minima Theo.: **a–f**, larval characters (**b**, pecten-teeth; **c**, comb-teeth; **d**, preclypeal spines); **g**, base of antenna of ♀; **h**, proboscis and palp of ♂.

Tibiæ and tarsi dark brown, with pale yellowish scaling over the joints between segments. *Abdomen*: dorsum dark brown, narrow basal creamy bands, widening out at sides in most specimens. Venter pale brown.

♂.—Very similar to ♀. Antennæ plumose. Palpi only slightly longer than in ♀. Proboscis very much swollen apically (fig. 27, **h**).

PUPA.—Unknown.

[LARVA † (fig. 27, a–f).—*Antennæ* rather long but stout, shaft spicular, mostly white, but with a narrow blackish ring at base and another beyond the tuft, latter far beyond the middle, large, externally placed, with about 20 simple branches; subapical hairs both long, rather stout, simple, pale; one apical hair long (but shorter than the subapical), stout, blackened; portion of antenna between subapical and apical hairs short and stout. *Frontal hair A* with 8–10 plumose branches, moderately long; *B* with 2 strong plumose branches; *C* with 6–8 plumose branches, about as long as *A*; *B* and *C* nearly side by side and not far apart; *d* small, 2–3-branched, a little in front of *C*. Preclypeal spines stout and rather strongly barbed, especially on inner side. Mesopleural plate small, without spine; metapleural plate not much larger, with short, inconspicuous spine. *Comb* of about 6–8 teeth in one row. *Siphon* rather short, index 2·5–3; two strong simple pecten-teeth; tuft large and inserted near base. Valves large, unmodified. *Anal segment* without spines on posterior margin; *lh* rather short, 5–7-branched; papillæ equal, short.]

DISTRIBUTION.—Type-localities, as given above; also BENGAL: Calcutta *, vii. & viii. 1907 (*Annandale*); xi. 1910 (*H. N. Sharma*); viii. 1911 (*Graveley*); Sonarpur *, x. 1925 (*M. O. T. Iyengar*); Dacca *, xii. 1911 (*S. K. S.*). ORISSA: Puri *, i. 1911 (*Annandale & Graveley*); Ranihat *, i. 1922 (*S. Sundar Rao*). ASSAM: Nalbari *, Kamrup dist., ix. 1928 (*Sobha Ram*); Golaghat *, Sibsagar dist., xii. 1924 (*Barraud*).

Outside India has been recorded from BORNEO and HONG KONG.

Genus **MANSONIA** Blanchard, 1901.

C. R. Soc. Biol. liii, p. 1045. Genotype, *Culex titillans* Walk.

Tæniorhynchus L.-Arribalzaga (nec Weinland), 1891, Rev. Mus. La Plata, i, p. 374. Genotype, *Culex titillans* Walk.

Panoplites Theobald (nec Gould), 1901, M.C. ii, p. 173. Genotype, *Culex titillans* Walk.

This genus is now divided into four subgenera—*Mansonia*, s. str., *Rhyncotænia* Bréthes, *Coquillettidia* Dyar, and *Mansonioides* Theo. The last two only are represented in India, the other two being purely American. There have been a number of changes in the classification of the genus, and for some years, up to 1930, it was generally known as *Tæniorhynchus* L.-Arrib. I am in accord with the views of Edwards and others that this name is preoccupied by *Tæniorhynchus*

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† [Described from specimens sent by Dr. R. B. Jackson from Hong Kong. The larva closely resembles that of the African *F.* (*Ingramia*) *malfeyti* Newst. as figured by me in 1912.—F. W. EDWARDS.]

Weinland. The reader is referred to Edwards (1932, pp. 114–120) * for synonymy and definitions of the four subgenera. The two subgenera included here may be recognized by the characters given below ; as they show a number of structural differences they are more conveniently dealt with separately.

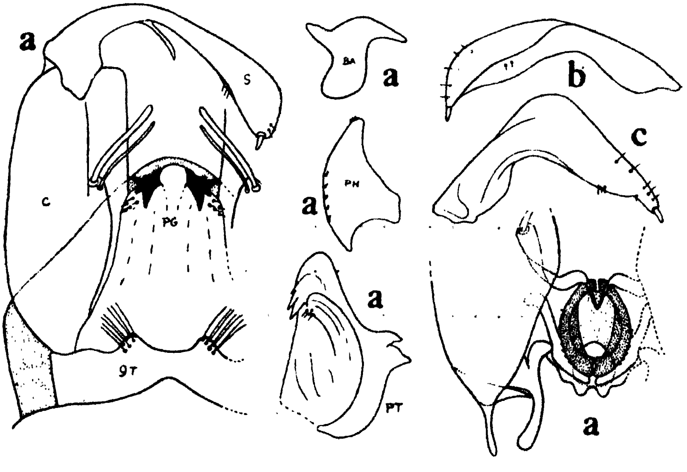
Subgenus **COQUILLETTIDIA** Dyar, 1905.

Proc. Ent. Soc. Wash. vii, p. 47. Genotype, *Culex perturbans* Walk.

Chrysoconops Theobald, 1907, M.C. iv, p. 491 (in part).

ADULT.—The three Indian species are yellow or yellowish-brown mosquitoes of moderate size, resembling some species of *Aëdes* (*Aëdimorphus*) in the form of the ♂ palpi, which are slightly longer than the proboscis, the last two segments subequal in length, turned downwards, and bearing hair-tufts. The general structure is very much as in *Aëdes*, but there are no postspiracular bristles (this appears to be the only constant character applicable to both sexes distinguishing the subgenus from *Aëdes*). Distinct from *Culex* in absence of pulvilli. Tarsal claws of ♀ all simple, those of fore and mid-legs of ♂ unequal, the larger toothed ; wing-scales narrow and lanceolate ; pleuræ with only a few small patches of scales.

Fig. 28.



♂ hypopygial structures of *Mansonia*, subgenus *Coquillettidia* : **a**, *crassipes* ; **b**, *novochracea*, style ; **c**, *M.* (*C.*) *ochracea* Theo. Lettering as on p. 4.

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* See also Barraud & Covell 1928, p. 676 (buccal cavity).

PUPÆ of Indian species unknown; those of non-Indian species have the tip of the respiratory horn modified into a spine for piercing tissues of plants; no dendritic tuft on I, no bristles on following segments; paddles fairly long and narrow, emarginate at tips, no fringe or apical hair.

LARVÆ of Indian species not known with certainty. A larva of probably *M. crassipes* or *M. ochracea* has been described by Edwards & Given (1928, p. 347). This and other non-Indian species of the subgenus have a very short siphon, the valves being modified for piercing tissues of plants; the part of the antenna beyond the subapical bristles is very long and flexible and has been said to have a prehensile function.

DISTRIBUTION and BIONOMICS.—Only one species is at all common in India and little is known of the habits, but the ♀♀ probably attack man. The larvæ and pupæ live in mud amongst the roots of aquatic plants and seldom come to the surface. About 27 species of the subgenus are known, and representatives occur in the Palæarctic, Ethiopian, Oriental, and Australian regions, some extending to the Pacific Islands and New Zealand; one species is known from North America.

Key to Adults.

1. Yellowish-brown; purplish scales on first 4 or 5 abdominal tergites; wing-scales mainly dark	*crassipes*, p. 120.
Yellow or bright golden; abdomen yellow-scaled; wing-scales all yellow	2.
2. Integument of mesonotum and pleuræ uniformly pale	*ochracea*, p. 122.
Integument of mesonotum with short brown stripe in front of each wing-base; pleuræ with brown stripe on upper part and a small brown marking below mesepimeron.	*novochracea*, p. 121.

52. **Mansonia (Coquillettidia) crassipes** (van der Wulp), 1892.

Bijd. Fauna Mid. Sumatra, Dipt. p. 9 (♀) (*Culex*). TYPE-LOC.: Soeroelangoen, Sumatra. TYPE: ♀ in Leiden Mus.

Tæniorhynchus brevicellulus Theobald, 1901, M.C. ii, p. 212 (♂ & ♀). TYPE-LOC.: Selangor, Malay Penin. (*Wray*) (♀); Thayetmyo, Burma (*Watson*) (♂). TYPE: ♂ & ♀ in Brit. Mus.

Chrysoconops pygmeus Theobald, 1908, Rec. Ind. Mus. ii, p. 300 (♀). TYPE-LOC.: Sylhet, Assam (*Hall*). TYPE: ♀ in Ind. Mus. Theobald, *ib.* 1910, iv, p. 25 (♂). TYPE-LOC.: Purnea, Bihar (*Paiva*). TYPE: ♂ in Ind. Mus.

Chrysoconops fuscopteron Theobald, 1911, Tijd. v. Ent. liv, p. 239 (♀). TYPE-LOC.: New Guinea (*Dr. Koch*). TYPE: ♀ in Amsterdam Mus.

ADULT *.—Distinguished by its yellowish-brown thorax and dark wings and legs. Wing 4·5–5 mm.

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* Leicester 1908, p. 163; Theobald 1910 *b*, p. 435; Edwards 1913 *b*, p. 230 (syn.), 1924, p. 365, and 1925 *a*, p. 260; Dyar 1925, p. 42; Barraud 1927 *d*, p. 556; Bonne-Wepster 1930, p. 396.

♀.—*Head* covered with narrow and upright forked yellow scales, broader yellow scales at sides, bristles yellow; antenna, palpi, and proboscis brown, last with violet sheen, palpi ¼–⅓ length of proboscis. *Thorax*: integument yellowish or brown, with sparse covering of narrow yellow scales and bristles, scutellar scales hair-like, yellow, usually sparse, integument of pleuræ brown or dark yellow, a patch of silvery flat scales on upper part of mesepimeron, another on lower part of sternopleura. *Wings*: dark scaled, a few yellow scales at extreme base in some specimens, membrane with pronounced purple, blue, and green reflections. *Legs*: femora yellowish at base, purplish on apical ½, hind femur with some silvery scales on outer side in middle, tibiæ and tarsi brown, with purple or brassy sheen. *Abdomen*: first four or five tergites usually covered with purple scales, following segments yellow-scaled, but markings variable, some specimens having very few yellow scales on dorsum, in others they are much more numerous.

♂.—Markings as in ♀; palpi longer than proboscis by about length of last segment, latter about ½ length of penultimate segment, both moderately hairy and turned downwards. *Hypopygium* (fig. 28, **a**): shape of style characteristic.

PUPA.—Unknown.

LARVA not known with certainty (*vide* remarks above under subgenus).

DISTRIBUTION.—Common in the PUNJAB and eastwards to ASSAM and BURMA, and southwards through PENINSULAR INDIA to CEYLON.

The range extends through MALAYA to AUSTRALIA and FIJI.

53. **Mansonia (Coquillettidia) novochracea** (Barraud), 1927.

Ind. Journ. Med. Res. xiv, p. 558 (♂) (*Tæniorhynchus*). TYPE-LOC.: Nongpoh, Khasi Hills dist., Assam, vii. 1932 (*Barraud*). TYPE: ♂ in Brit. Mus. (Allotype ♀ from Margherita, Lakhimpur dist., Assam, v. 1920 (*T. B. Fletcher*), in M.S.I. coll. Kasauli.)

ADULT.—A medium-sized bright yellow mosquito with some dark markings on thoracic integument*. Wing 4–4·5 mm. or rather more.

♀.—General coloration bright yellow; *head* covered with narrow and upright yellow scales, tori yellow, flagellum of antenna and hairs brown, palpi and proboscis yellow, latter dark at tip, palpi rather more than ¼ length of proboscis. *Thorax*: integument of mesonotum yellow, a short brown

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* [The nearly related *M. giblini* Taylor (*conopas* Theo.), which is widely distributed from Malaya to Queensland, differs in having dark spots on posterior ½ of mesonotum; lateral lobes of scutellum dark; hind femur without black ring at tip, etc.]

stripe laterally on each side in front of wing-roots, a fairly dense covering of narrow yellow scales and bristles ; scutellar scales and bristles yellow, former hair-like and few ; integument of pleuræ yellow, a dark stripe from the posterior margin of *ppn* to posterior margin of mesepimeron, another small dark area below lower margin of mesepimeron, very few pale flat scales. *Wings* entirely yellow scaled. *Legs* : yellow, with blackish-brown markings at tips of femora (on hind femur forming a narrow apical black ring), bases and apices of tibiæ, and apices of tarsal segments, dark markings on tarsi of fore and mid-legs narrow, on hind legs wider, occupying fully ½ of segments 2 and 3, femur and tibia of mid-leg speckled with brown scales. *Abdomen* : dorsum yellow scaled, small dark apical markings on tergites laterally, venter yellow.

♂.—Markings as in ♀ ; antennal shaft and plume-hairs yellowish, segments distal to plumes brown, palpi longer than proboscis by nearly length of last segment, last two segments subequal in length, with tufts of yellowish brown hairs, scales brown except for yellow ring at base of penultimate segment, the long segment of palpi yellow scaled, with some brown scales and long yellow hairs at tip. *Hypopygium* : very similar to that of *M. crassipes*, but style of different form (fig. 28, **b**).

PUPA and LARVA.—Unknown.

DISTRIBUTION.—Known only from the type-localities.

54. **Mansonia (Coquillettidia) ochracea** (Theobald), 1903.

M.C. iii, p. 263 (*Tæniorhynchus*) (♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Durham*). TYPE : ♀ in Brit. Mus.

Mansonia chrysogona Knab, 1909, Ent. News Phil. xx, p. 368 (♂ & ♀). TYPE-LOC. : Parang, Mindanão, P.I., v. 1906. TYPE : ♂ & ♀ in U.S. Nat. Mus.

ADULT †.—Very similar to *M. novochracea*, described above, but differs in absence of dark markings on integument of mesonotum and pleuræ and slightly in markings of legs of ♀, the fore and mid-tarsi being yellow or brown without any distinct banding, hind tarsi mainly brown, with yellow scaling at bases of first one or two segments, banding more distinct in ♂. Palpi in ♀ dark at tips. Style of ♂ hypopygium more elbowed than in *M. novochracea* (fig. 28, **c**).

PUPA and LARVA.—Unknown.

DISTRIBUTION.—ASSAM : **Gauhati *, Kamrup dist., v. 1918 and v. 1920** (*T. B. Fletcher*) ; **Margherita *, Lakhimpur dist.,**

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† Leicester 1908, p. 164 ; Edwards 1922 *d*, pp. 457 and 469 (syn.) ; Barraud 1927 *d*, p. 559 ; Bonne-Wepster 1930, p. 389.

v. 1920 (*T. B. Fletcher*); Cherrapunji, Khasi Hills dist., x. 1920 (*Senior-White*). BENGAL: Bossandhur, Khulna dist., viii. 1919 (*J. T. Jenkins*).

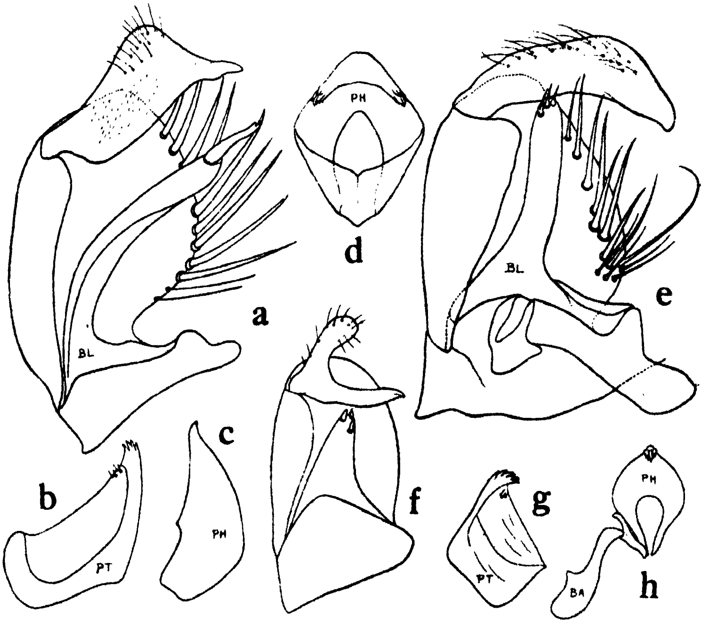
Recorded also from MALAYA, SIAM, PHILIPPINES, and CHINA (Hangchow, Feng-Swen Li).

Subgenus **MANSONIOIDES** Theobald, 1907.

M.C. iv, p. 498. Genotype, *M. septemguttata* Theo.

ADULT.—Size moderate and build robust; general coloration yellowish-brown or black, legs with many pale markings and white rings on tarsi; wings speckled with light and dark broad scales, many of which are asymmetrical; palpi of ♂ longer than proboscis, penultimate segment turned upwards, no distinct hair-tufts, terminal segment minute and turned slightly downwards; pleural bristles well developed, usually 10–20 postspiracular, 9–15 *ppn*, 12–18 upper mesepimeral, 4–9 towards lower part of mesepimeron; tergite VIII of ♀ with a number of chitinous hooks or teeth, the arrangement of which is of value in identification, lobes of sternite VIII

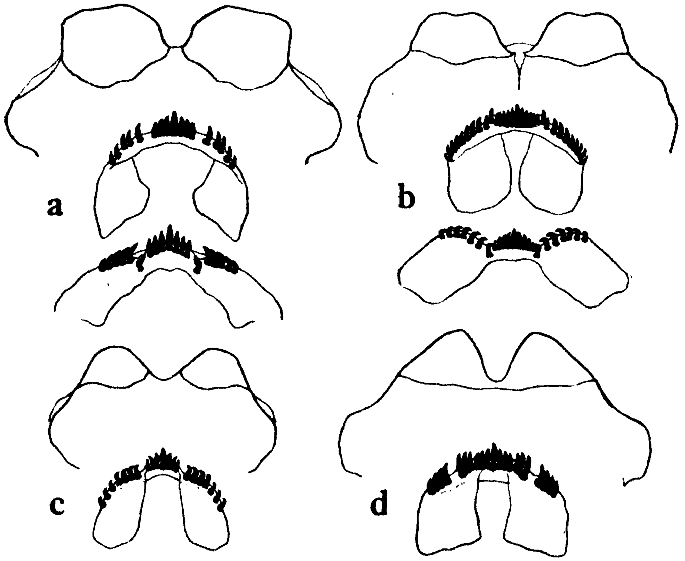
Fig. 29.



♂ hypopygial structures of *Mansonia*, subgenus *Mansonioides*: **a–c**, *uniformis*; **d**, **e**, *indiana*; **f–h**, *annulifera*. Lettering as on p. 4.

of characteristic shape in different species, two chitinised spermathecæ. Coxite of ♂ hypopygium short and wide, a large process arising from base on inner side, style of characteristic form, phallosome without lateral plates, a few small teeth at apex, paraprocts with a few teeth at crown and several minute hairs. Figures are given of the hypopygial details of the ♀♀ of all the Indian species. J. Bonne-Wepster (1930, pp. 197–212) first drew attention to the importance of the arrangement of chitinous hooks on tergite VIII of the ♀♀; it has been found also that the shape of the lobes of sternite VIII is of diagnostic value (Edwards, 1930, p. 541).

Fig. 30.



Tergite VIII (with teeth) and sternite (bare) of ♀, *Mansonia*, subgenus *Mansonioides* (flat preparation): **a**, *uniformis*; **b**, *indiana*; **c**, *annulifera*; **d**, *annulipes*.

An examination of these structures, and of the hypopygia of the ♂♂, has proved of great value in making correct identifications. This method should always be used in cases of doubt (see fig. 30).

Pupa.—Very similar to that of subgenus *Coquillettidia*, referred to above; tip of respiratory horn modified into a spine for piercing the tissues of plants; but one or two pairs of stout bristles present on hind margins of abd. seg. II–VII.

Larva, 4th stage * (fig. 31).—The larvæ of three species have been isolated in India by Mr. M. O. T. Iyengar at

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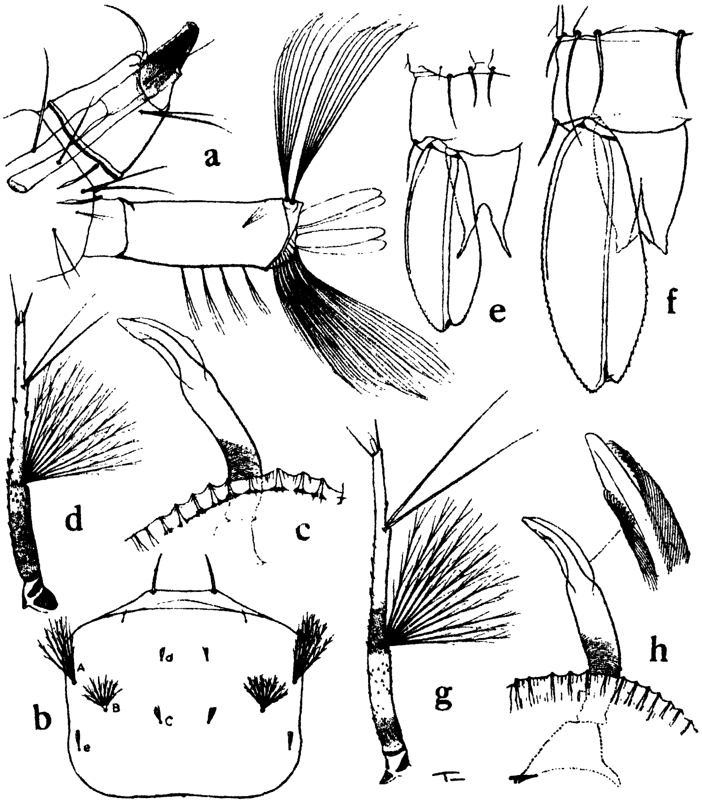
* Ingram & Macfie 1917, p. 137.

Trivandrum, Travancore, and the skins of these and of pupæ, together with the corresponding adults, have been kindly loaned to me for description. The following characters are common to all three species; all are very similar in general structure :—Antennal shaft rigid and divided into three parts of about equal length by the hair-tuft and subapical bristles

Fig. 31.



Larval and pupal structures of *Mansonia*, subgenus *Mansonioides*: **a–c**, *indiana*; **d**, **e**, *annulifera*; **f–h**, *uniformis*. (**b**, clypeus; **c**, **h**, respiratory horn with median ridge of thorax).

(in *Coquillettidia* the apical part is very long and flexible), shaft with a number of small spines; subapical bristles long and reaching beyond end of antenna. Mouth-brushes fairly large, hairs simple. Preclypeal spines rather long and conspicuous. Frontal hairs *A*, *B*, *C* forming a concave row at about middle of clypeus, hair *d* directly in front of *C*, but much further forward, and anterior to level of *A*; *C* and *d* all very small and difficult to see, *B* also small ; *A* larger, and usually with 6–8 rather broad plumose branches. Mentum small, with comparatively large teeth, a large central one, with 4–5 smaller on each side. Hairs of thorax and abdomen only moderately developed. Comb usually of 2 very long blunt teeth. Siphon very short and conical, valves black and modified for piercing tissues of plants, and with 2 pairs of long spines ; a single pair of branched hairs on tube near base of valves. Anal segment longer than wide in side view, as long as, or longer than, siphon, and completely ringed by plate. Both pairs of subdorsal hairs with a number of branches, these and fan-hairs all about same length. Fan-plate well developed. Usually 4 small branched hairs ventrally between fan-plate and base of segment. Lateral hair some distance from posterior margin and towards dorsum, of about 4 short, fine branches.

DISTRIBUTION and BIONOMICS [*].—Four species are known in the Indian area, two being common and widespread. The ♀♀ readily attack man, and are at times very troublesome. At least one species (*annulifera*) is a transmitter of Filaria (*Iyengar*, 1932) in India, and most probably other species are instrumental in the spread of this disease. About nine species in all are known, and are confined to the Old World ; of two species found in Africa, one (*uniformis*) has an extensive distribution through the Oriental region to Japan and Australia ; the remaining species are found in the Malayan and Australian regions. The larvæ and pupæ attach themselves to stems and rootlets of floating vegetation, and seldom come to the surface except when the pupa is ready for emergence. They should be sought for in ponds and swamps, particularly those much overgrown with vegetation.

Key to Adults.

1. Mesonotum marked with distinct round spots of white scales .... 2.
   Mesonotum not so (though there may be small indefinite white spots or patches) .... 3.
2. Yellowish-brown ; mesonotum marked with 4 (or more) distinct round white spots; rather broad white scales on mid-lobe of scutellum .... *annulifera*, p. 127.
   Brownish-black ; mesonotum marked with 2 (or 3) round white spots ; scales on mid-lobe of scutellum narrow............. *longipalpis*, p. 128.
3. Mesonotum marked with a pair of sublateral greenish stripes on a brown ground ...... *uniformis*, p. 129.
   Mesonotum dark brown, not marked with greenish stripes ; some white scales, tending to form indistinct spots or patches, in some specimens.......................... *indiana*, p. 130.

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[*] Ingram & Macfie 1917, p. 137 ; Schwatz 1930, p. 311.

55. **Mansonia (Mansonioides) annulifera (Theobald), 1901.**

M.C. ii, p. 183 (*Panoplites*) (♀). TYPE-LOC.: Madras, xii. 1899 (*Goodrich*), and Quilon, Travancore (*James*). TYPE: ♀ in Brit. Mus.

Panoplites seguini Laveran, 1901, C. R. Soc. Biol. liii, p. 991. TYPE-LOC.: Hanoi, Tonkin. TYPE: non-existent.

Mansonioides septemguttata Theobald, 1907, M.C. iv, p. 499 (♀). TYPE-LOC.: Sarawak (*Barker*). TYPE: ♀ in Brit. Mus.

ADULT *.—Small yellowish-brown species. Wing about 4 mm.

♀.—*Head*: some white scales along eye-margins and at sides; vertex and nape with narrow yellow and numerous pale upright scales, tori and clypeus pale brown, flagellum of antenna brown, with lighter rings; palpi about $\frac{1}{5}$ length of proboscis, yellow basally, broadly white apically; proboscis pale brown or yellow, usually darker at base and on apical $\frac{1}{3}$. *Thorax*: mesonotum with narrow yellow or golden scales, two conspicuous round white spots near front margin, another pair posterior to these, and three other spots, less distinct, at about level of wing-roots; scutellar scales white, broad on mid-lobe, narrow on lateral lobes; some narrow white scales on *ppn* and patches of broader white scales on pleuræ. *Wings*: speckled with yellowish and dark brown, broad, asymmetrical scales, fairly evenly mixed. *Legs*: yellowish, marked with numerous snowy white rings, about 5 rings on each femur, knees also white, tibiæ with 4–5 rings, tips also more or less distinctly white; segment 1 of tarsi of all legs with medial white ring, and basal ring also on mid- and hind legs and on 4 and 5 of hind legs. *Abdomen*: scaling on dorsum brown, or yellowish, and white, the last arranged chiefly in lateral patches towards apical border of each segment; lateral chitinous hooks on tergite VIII widely and evenly spaced (fig. 30, **d**), much as in *indiana*, but less curved; postgenital plate not divided to the base into two lobes as in *indiana*, the apex only being divided into two small lobes.

♂.—Palpi $1\frac{1}{8}$ length of proboscis; yellowish, with two white rings on long segment, a white ring at base of penultimate, the small terminal segment entirely white. Scaling of head, body, wings, and legs as in ♀. *Hypopygium* (fig. 29, **f–h**): style divided nearly to the base into two arms; process arising from base of coxite, with 3 spines at apex.

PUPA.—Respiratory horn narrower than in *uniformis* or *indiana*, being 8–9 times length of greatest width; terminal spine about $\frac{1}{5}$ of total length. Posterior borders of II–IV with only one pair of long spines, V–VII with two pairs

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[*] Leicester 1908, p. 174; Edwards 1913 *b*, p. 230 (syn.); Barraud 1927 *d*, p. 559; Bonne-Wepster 1930, p. 199.

of similar spines. Paddles less emarginate at tips than in allied species.

LARVA (fig. 31, **d**, **e**).—Differs from those of allied species in having basal ½ of antenna darkened (in *uniformis* and *indiana* there is a dark ring at base and another at level of origin of tuft).

DISTRIBUTION.—Common in BIHAR, ORISSA, BENGAL, ASSAM, BURMA, EAST and SOUTH-WEST COASTS of Indian Peninsula, and found in CEYLON. Specimens have been examined from Fyzabad, U.P., and from Central Provinces, but, from available records, the species does not appear to occur west of a line drawn from the western boundary of Nepal to Bombay.

Recorded from MALAY PENINSULA, SIAM, PHILIPPINES, and MALAY ARCHIPELAGO.

56. **Mansonia (Mansonioides) longipalpis** (van der Wulp), 1892.

Bijd. Fauna Mid. Sumatra, Dipt. p. 9 (*Culex*) (♀). TYPE-LOC. : Sumatra. CO-TYPE : ♀♀ in Leiden Mus.

Culex annulipes Walker (nec Meigen), 1857, Proc. Linn. Soc. Lond. i, p. 6 (♀). TYPE-LOC. : Singapore (*A. R. Wallace*). TYPE : ♀ in Brit. Mus.

ADULT *.—Differs from *M. annulifera* in larger size and darker coloration †. Wing about 4·5 mm.

♀.—*Head* : narrow white scales to eye-margins, vertex and nape with dark brown narrow and upright scales ; palpi about ⅓ length of proboscis, dark brown, with conspicuous white tips ; proboscis yellow on middle ⅓, otherwise dark brown, with scattered yellow scales. *Thorax* : mesonotal scales dark brown, a pair of round white spots composed of broad scales towards front, another median white spot posteriorly of narrow white scales, some narrow white scales on front margin forming three patches, some broad white scales laterally in front of wing-roots, and sometimes some narrow white scales at sides more anteriorly ; scutellar scales silvery white and all narrow ; three patches of broad white scales on pleuræ, and both narrow and broad white scales on *ppn*. *Wings* : very similar to those of *M. annulifera*. *Legs* : dark brown, with numerous white rings having much the same arrangement as in *M. annulifera,* but white rings on femora less complete, except one preapical. *Abdomen* : dorsum dark brown or black, tergites I and II with a few yellow scales at base in middle ; II, III, V, and VI with small lateral patches of white and yellow scales, IV with usually some white scales on apical border. Chitinous hooks on tergite VIII much as in *M. uniformis*, but there is a more pronounced gap between the lateral and median series ; lobes of sternite VIII rather pointed.

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* Leicester 1908, p. 172 ; Edwards 1922 *d*, p. 457 ; 1925 *a*, p. 260 ; 1930 *b*, p. 542 ; 1932, p. 120 (syn.) ; Barraud 1927 *d*, p. 561 ; Bonne-Wepster 1930, p. 206.

† [*M. bonneæ* Edw. (Malay Peninsula and Archipelago) is closely allied, differing almost solely in hypopygium. The two species occur together in the Malayan region and, perhaps, also in India.]

♂.—*Palpi* white-ringed as in *M. annulifera*, but ground-colour darker. Markings otherwise as in ♀. *Hypopygium* : resembles that of *M. uniformis*, differing in form of phallosome ; a pointed spine at tip of process of coxite.

PUPA and LARVA.—Unknown.

DISTRIBUTION (as checked by author from examination of hypopygia).—ASSAM : Margherita, Lakimpur dist., v. 1920 (*T. B. Fletcher*) ; Nongpoh, Khasi Hills dist., vii. 192 and ix. 1926 (*Barraud*) ; Cinnamara, Jorhat, Sibsagar dist., 1932 (*D. Manson*). EASTERN BENGAL : Chittagong Hill Tracts, Rangamati, viii. 1922 (*Barraud*). Some previously published records have been found to be incorrect ; others are considered doubtful.

Known from MALAY PENINSULA and ARCHIPELAGO and SIAM and recorded from PHILIPPINES ; records from New Guinea and Australia are doubtful *.

57. **Mansonia (Mansonioides) uniformis** (Theobald), 1901.

M.C. ii, p. 180 (*Panoplites*) (♀). TYPE-LOC. : Quilon, Travancore (*James*), and Taiping, Malay Penin. (*Wray*). CO-TYPE : ♀♀ in Brit. Mus.

ADULT †.—Brownish species, with less defined rings on femora than in the last two. Wing about 4·5 mm.

♀.—*Head* : vertex and nape with yellow decumbent and brown upright scales, those along eye-margins lighter, some broad pale scales low down at sides ; tori yellow, flagellum of antenna brown, with faintly lighter rings ; clypeus pale brown ; palpi about ⅓ length of proboscis, with scattered brown and yellow scales, those at tips lighter but not conspicuously white as in the two species described above ; proboscis mainly yellow, with the apical ⅓ dark brown, in many specimens narrowly dark at base also. *Thorax* : scales of mesonotum light brown and greenish, latter forming a pair of broad sublateral stripes from the front to above wing-roots ; scutellar scales narrow and pale yellow ; integument of pleuræ brown, several patches of broad white scales and some narrow pale scales on *ppn*. *Wings* : scaling very similar to the two species described above. *Legs*: four or five oblique pale markings on outer side of hind femur, similar but less definite markings on fore and mid-pair, pale tibial markings yellowish-tinged and run together; markings of tarsi as in *M. annulifera* but with yellowish tinge, not snow-white. *Abdomen*: dorsum dark brown, with lateral white and yellow patches and yellow apical bands in some specimens. Lateral chitinous hooks on tergite VIII curved and slightly separated from median series; lobes of sternite VIII larger and more rounded than in *M. indiana* (fig. 30, **a**).

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* [Such may refer to the allied *M. septempunctata* Theo., which has been confused with *M. longipalpis*.]

† Leicester 1908, p. 171 ; Edwards 1930 *b*, p. 542 ; Barraud 1927 *d*, p. 562 ; Bonne-Wepster 1930, p. 204.

♂.—*Palpi* rather more than 1¼ times length of proboscis, brown, with two pale rings on basal ½ and a narrower pale ring at base of penultimate segment, terminal segment minute and entirely pale; antenna about length of proboscis, with long brown plume-hairs; greenish stripes on mesonotum often less distinct than in ♀, otherwise markings are similar. *Hypopygium* (fig. 29, **a**–**c**): style wide, with pointed tip, a large process arising from base of coxite on inner side, ending in an appendage which is notched at tip.

PUPA (fig. 29, **h**).—Respiratory horn about 6 times length of greatest width; terminal spine between ⅓ and ¼ total length. Hind margin of abd. seg. IV–VII with two pairs of strong spines, VII having also a smaller third pair; II–III with only one pair. The spines are usually longer than in *indiana*, one pair on tergite V reaching as far as hind border of VII. Paddle as in fig. 31, **f**.

LARVA (fig. 31, **f**, **g**).—Antenna with a dark ring at base and another at level of origin of hair-tuft. For other characters see under subgenus above.

HABITAT.—Swamps and pools, especially those thickly overgrown with vegetation.

DISTRIBUTION.—Common in most parts of India (including ASSAM, BURMA, PENINSULAR INDIA) and CEYLON; less common in the north-west, but specimens have been received from the United Provinces, Punjab, Sind, and Bombay. Often abundant and a troublesome blood-sucker.

The range of this species extends from AFRICA, through the ORIENTAL REGION, to JAPAN and AUSTRALIA.

58. **Mansonia (Mansonioides) indiana** Edwards, 1930*.

Bull. Ent. Res. xxi, p. 541 (♂ & ♀). TYPE-LOC.: Bandjaran, S. Preanger, Java (*S. L. Brug*). TYPE: ♂ in Brit. Mus.

ADULT.—Very similar to *M. uniformis* described above, but differs in the absence of greenish stripes on the mesonotum, the scaling of that part being usually almost uniformly dark brown ; in some specimens there are some pale scales towards the lateral margins of mesonotum, and these may show up as faint light spots or areas in certain positions, but there are no definite round white spots as in *M. annulifera* and *M. longipalpis*. Chitinous hooks on tergite VIII of ♀ widely spaced and curved, without a definite gap between these and the median teeth (fig. 30, **b**). Lobes of sternite VIII slightly emarginate and smaller than in *M. uniformis* (compare fig. 30, **a** & **b**).

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* See also Bonne-Wepster 1930, p. 210 (as *T. africanus* Theo.). *M. indiana* has previously been confused with *uniformis* or taken to be *africanus*, but the three are distinct on hypopygial structures.

♂.—*Hypopygium* (fig. 29, **d**, **e**) : style in side view (mounted flat) fairly wide, with slightly hooked tip, process arising from base of coxite moderately wide and long, with several hairs at tip, no definite appendage.

PUPA (fig. 31, **c**).—Very similar to that of *uniformis* in shape of respiratory horn and in arrangement of bristles on abdominal segments, but these bristles usually shorter. Margin of head-capsule near base of antenna markedly crenulate, much more so than in *uniformis*.

LARVA (fig. 31, **a**, **b**).—No differences have been detected between the larvæ of this species and of *uniformis* in the material available. (For general structure see under subgenus above).

HABITAT.—As given for *uniformis*.

DISTRIBUTION (as checked by author by examination of hypopygia).—ASSAM : Nongpoh, Khasi Hills dist., and Dimapur, Sibsagar dist., vii. 1922 (*Barraud*) ; Gauhati, Kamrup dist., iii. 1925 (*Barraud*), and x. 1928 (*C. S. Swaminath*). BENGAL : Calcutta, Garden Reach, iii. 1931 (*Senior-White*). NILGIRI HILLS : Coonoor (no date). TRAVANCORE : Trivandrum, 1932 (*M. O. T. Iyengar*). BURMA (no date or locality).

Genus **AËDOMYIA** Theobald, 1901.

M.C. ii, p. 218 (*Ædeomyia*). Genotype, *A. squamipennis* L. Arrib.
Aëdomyia Edwards (emend.), Bull. Ent. Res. iii, 1912, p. 24.

ADULT * (fig. 33).—The single Indian species is a small mosquito with comparatively short legs, ornamented with a dense covering of white, black, and yellow scales, tufts of suberect scales at tips of mid- and hind femora. Antennæ about ¾ length of proboscis ; those of ♀ with very short hairs, flagellar segments short, thick and rounded, and all about equal in length ; those of ♂ plumose, last two segments thickened, but only slightly longer than others ; [penultimate segment without whorl of long hairs at base, differing in this respect from all other genera of Culicini, as well as from *Anopheles* and *Megarhinus*]. Palpi short in both sexes.

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* Edwards 1932, p. 121. See also Barraud 1927 *a*, p. 523 ; Barraud & Covell 1928, p. 676 (buccal cavity).

Other characters, as well as those of larva and pupa, and notes on distribution, are given below.

59. **Aëdomyia venustipes** (Skuse), 1889.

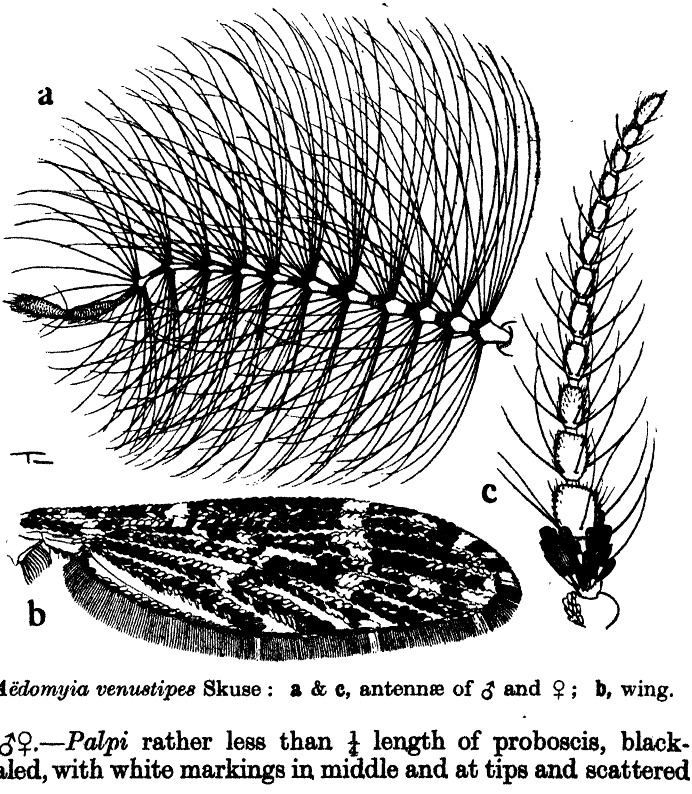
Proc. Linn. Soc. N.S.W. (2nd series), iii, p. 1761 (*Aëdes*) (♀). TYPE-LOC.: Elizabeth Bay, Sydney, Australia. TYPE: ♀ in Sydney Mus.

Aedeomyia catasticta Knab, 1909, Ent. News, xx, p. 387 (♀). TYPE-LOC.: Philippine Is. TYPE: ♀ in U.S. Nat. Mus.

Aedeomyia squammipenna Theobald, 1901, M.C. ii, p. 219 (in part) (nec *Aëdes squamipennis* L. Arrib.).

ADULT * (fig. 33).—Fairly easily recognized by generic characters given above. Wing about 3 mm.

Fig. 32.



Aëdomyia venustipes Skuse: **a** & **c**, antennæ of ♂ and ♀; **b**, wing.

♂♀.—*Palpi* rather less than ¼ length of proboscis, black-scaled, with white markings in middle and at tips and scattered

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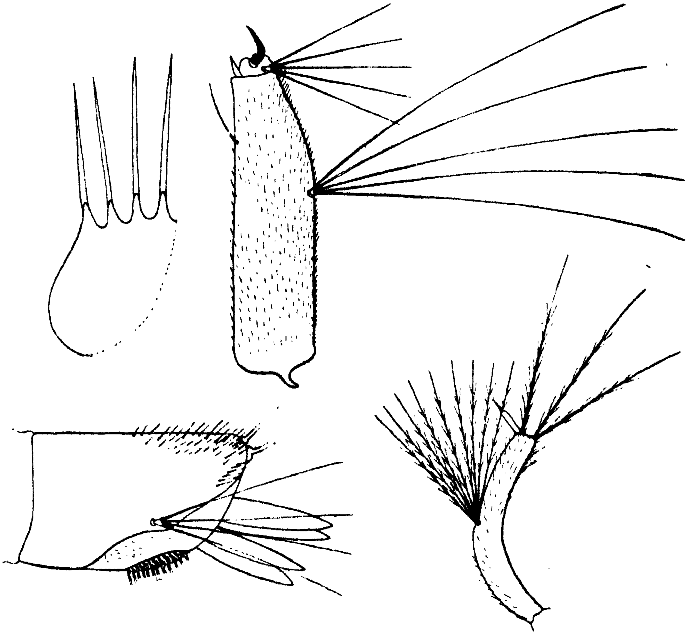
* Leicester 1908, p. 182 (*squammipenna*); Edwards 1924, p. 364 (syn.); 1929 *b*, p. 326; Barraud 1927 *a*, p. 523.

white scaling on upper surface; proboscis black, with three white rings. A broad median stripe of ochre-yellow scales on thorax, spreading out posteriorly in front of level of wing-roots; no spiracular or postspiracular bristles. *Wings*: densely clothed with dark brown, yellow, and white broad scales, the last arranged chiefly in three spots on costa and in smaller spots at forks of veins 2, 4, and 5. *Legs*: dark brown, speckled and spotted with yellowish and white scales, white basal and apical rings over the first two or three tarsal joints on fore and mid-legs and over all tarsal joints on hind legs, segment 5 being entirely white. *Abdomen*: dorsal surface mainly covered with ochre-yellow scales, patches of white scales at sides; venter brown, with many white scales, forming apical bands in some specimens.

Fig. 33.



Larval structures (portion of comb, siphon, anal segment, antenna) of *Aëdomyia venustipes* Skuse.

♂.—*Hypopygium* *: coxite short, simple; style with comb-like appendage at tip.

Pupa.—Respiratory horn of moderate length, with wide opening, the sides of which are reticulated with fine lines;

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* Edwards 1917, p. 229.

dendritic tufts on abd. seg. I small; one of the sublateral hairs on IV–VII long, with several shorter branches from base; lateral hairs on VII and VIII short, thick, and spine-like, with 2 or 3 branches; paddles moderately long and wide, with long terminal hair.

LARVA * (fig. 33).—*Antenna* with unusually long, wide, hairy shaft, with 3 long subplumose hairs at tip; tuft of about 10 subplumose hairs arising at about middle of shaft. *Thorax* with extremely long lateral, tufted, plumose hairs arising from chitinised plates, which bear thorn-like processes also. Teeth of *comb* unusually long and bristle-like, in one rank along posterior margin of thinly chitinised plate, 10–15 on each side of segment. *Siphon* short, whole surface setose; one pair of subposterior tufted hairs, with 5–6 extremely long branches, arising nearer apex than base, another pair, with shorter branches, on posterior valves, a pair of single hairs towards apex anteriorly; tip of siphon with a pair of strong curved spines; acus present, pecten absent. *Anal segment* (fig. 33) with both *isc* and *osc* and fan-hairs plumose along one side.

HABITAT.—Weedy pools, more usually those containing much vegetation.

DISTRIBUTION.—Common in SOUTH INDIA, along the east coast of the Peninsula, in ORISSA, BIHAR, BENGAL, ASSAM, and BURMA, and is found in CEYLON. It does not appear to occur west of a line drawn from the western boundary of Nepal to Bombay. The author has seen single specimens from Bhopal, Central India, and Poona.

Beyond the limits of the Indian region this species occurs throughout the Oriental region and in AUSTRALIA.

Genus **AËDES** Meigen, 1818.

Syst. Beschr. i, p. 13. Genotype, *A. cinereus* Mg. (For Oriental synonymy see under subgenera.)

This genus, as at present constituted, includes more than 400 species, of which more than 100 are found in India, and it is certain that a further number await discovery. The Indian species are arranged in the following pages under subgenera, and a key is given to these. The adults vary much in size and ornamentation. As the group as a whole is an important one, and as difficulty may be experienced in deciding whether a particular specimen belongs to it or not, it may be useful to set forth the characters distinguishing *Aëdes* (in the adult stage) from other genera represented in India.

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* Barraud 1923 *h*, p. 505 (*catasticta*).

The genus *Aëdes* differs from *Uranotænia*, *Harpagomyia*, *Topomyia*, and *Hodgesia* in the venation of the wing (vein 6 ending nearer apex of wing than level of fork of 5), and in presence of fringe of hairs on squama of wing; from *Theobaldia* and *Tripteroides* in the absence of spiracular bristles and presence of postspiracular bristles, from *Theobaldia* also in absence of hairs from underside of wing at base; from *Culex*, *Mansonia* (*Coquillettidia*), *Ficalbia*, and *Aëdomyia* in presence of postspiracular bristles; in addition, from *Culex* in absence of pulvilli, from *Ficalbia* in not having the proboscis enlarged at tip, and from *Aëdomyia* in structure of antennæ; from *Heizmannia* and *Hæmagogus* in form of *apn* lobes (these being normal in *Aëdes* and not enlarged or approximated behind the head), from *Heizmannia* also in the postnotum being without hairs; from *Orthopodomyia* in the relative lengths of tarsal segments, segment 4 on front legs of ♀ not being shortened; from *Mansonia* (*Mansonioides*) in wing-scaling (in *Aëdes* the scales are never very large and asymmetrical) and in the structure of the hypopygium in both sexes. As regards the remaining genus, *Armigeres*, which is evidently very closely allied to *Aëdes* (subgenus *Stegomyia*), but retained as a separate genus chiefly on account of the structure of the larvæ, the only difference in the adults appears to be in form of the proboscis, which in *Armigeres* is somewhat curved downwards towards the tip, the curved part being slightly compressed laterally. In *Aëdes* the proboscis is straight (but tends to curve upwards in dried specimens), and is not laterally compressed.

The palpi of the ♂♂ are of variable length and form, those of the ♀♀ not usually more than ¼ length of proboscis. Antennæ of ♂ nearly always distinctly plumose, with the last two segments elongate; those of ♀ with moderately long hairs and all flagellar segments of about equal length. Bristles on mesonotum usually well developed. Structure of hypopygium of importance in both sexes in differentiating subgenera and species (see keys and under subgenera).

Pupa.—Respiratory trumpet usually fairly short, with round, slightly oblique opening. Dendritic tufts on abdominal segment I usually well developed; hairs on posterior margins of II–VII nearly always fine and inconspicuous, either branched or single, not bristle-like; rather small branched hairs on outer posterior corners of VII–VIII. Paddles usually fairly wide and rounded or slightly elongate; hind margin not markedly serrated and usually without conspicuous fringe; a small terminal hair, which may be branched. This stage of the Indian species has been very little studied at present. So far as is known the subgeneric and specific differences are slight.

LARVA.—Mouth-parts not modified for predaceous habits except in subgenus *Mucidus*. Median hairs of mouth-brushes in many species slightly hooked, and with more or less obvious serrations along one side apically. Arrangement and form of the four important pairs of frontal hairs very variable and of importance in identification. Thorax with moderately developed hairs and, in a few species, with large spines, or thick barbed hairs, on dorsum. Segments I–VIII of abdomen without chitinised plates, except in a few species of subgenus *Stegomyia*, in which there are lateral plates on VIII. Comb of teeth present on VIII, variable in number and arrangement. Siphon usually 2–3½ times length of diameter at base, but longer in a few species; only one pair of hair-tufts on tube, towards posterior border. Pecten present, variable in number and shape of individual teeth. Anal segment with chitinous saddle, rarely enclosed in chitinous ring. Lateral hair usually fairly long. Outer subdorsal hairs single and long, inner pair shorter and usually divided into 2 or more branches. Anal fan moderately developed or rather small.

EGG.—With thick shell, spindle-shaped or elliptical, often with fine sculpturing on surface.

DISTRIBUTION and BIONOMICS (see remarks under subgenera).—Eggs, so far as known, laid singly; very resistant to desiccation. Several species are known to be capable of transmitting disease. Many are day-flying, and ♀♀ are active blood-suckers. Larval habitat very variable in different subgenera.

Keys to Subgenera.

♀♀.

1. Segment VIII narrow and completely retractile; cerci long and narrow and projecting from ring of segment VII....	2.
Segment VIII broader and not completely retractile; cerci shorter and broader (but sometimes rather long in subgenus *Aëdes*)	6.
2. Large yellow, white, and brown mosquitoes with outstanding scales on body and legs, giving them a shaggy or mouldy appearance; wing-membrane clouded in region of c.-vs. 2–3, 3–4, 4–5, these three being almost in a straight line	MUCIDUS, p. 144.
Smaller mosquitoes, not of shaggy appearance; wing-membrane not clouded	3.
3. Dark species, with conspicuous lateral yellow scaling on mesonotum	BANKSINELLA, p. 269.
Ornamentation otherwise..............	4.
4. First hind tarsal segment as long as tibia; dark brown species, without ornamentation	RHINOSKUSEA, p. 216.

	First hind tarsal segment shorter than tibia, as usual; body and legs usually ornamented	5.
5.	No lower mesepimeral bristles	**Aëdimorphus** (part), p. 246.
	One or two lower mesepimeral bristles usually present	**Ochlerotatus**, p. 147.
6.	Tarsal claws toothed, at least on fore and mid-legs	7.
	Tarsal claws all simple	11.
7.	Sternite VIII large and prominent, ornamentation various	**Finlaya**, p. 153.
	Sternite VIII smaller and less prominent; dorsal surface of head with many flat scales	8.
8.	Scutellar scales all narrow, dark species, with little ornamentation	**Aëdes** (part), p. 277.
	Scutellar scales broad and flat, at least on mid-lobe; species with conspicuous ornamentation	9.
9.	Scutellar scales broad and flat on mid-lobe, narrow on lateral lobes	*A.* (*Aëdim.*) *nummatus*, p. 265.
	Scutellar scales broad and flat on all lobes.	10.
10.	Proboscis dark; *apn* lobes with broad flat scales	**Stegomyia** (part), p. 217.
	Proboscis with a white ring; *apn* with narrow scales only	**Christophersiomyia**, p. 212.
11.	Black species, with snow-white markings and white basal bands on tarsi	**Stegomyia** (part), p. 217.
	Species with little or no ornamentation	12.
12.	Scutellar scales all narrow	**Aëdes** (part), p. 277.
	Scutellar scales broad and flat	13.
13.	First hind tarsal segment as long as tibia; proboscis unusually long	**Rhinoskusea**, p. 216.
	First hind tarsal segment shorter than tibia, as usual; proboscis not unusually long	14.
14.	Head with white stripe either side of middle line	**Diceromyia**, p. 271.
	Head all dark dorsally	**Cancraëdes**, p. 297.

♂♂ (as far as known).

1.	Palpi at least ½ length of proboscis, usually longer	2.
	Palpi short, not more than ¼ length of proboscis	9.
2.	Palpi about ½ length of proboscis, thin, and without hair-tufts	*A.* (*Steg.*) *albolineatus*, p. 243; *A.* (*Aëdim.*) *nummatus*, p. 265.
	Palpi more than ½ length of proboscis; with or without hair-tufts	3.
3.	Phallosome divided into lateral plates, bearing chitinised teeth	4.
	Phallosome not divided into lateral plates, tube-like or scoop-shaped and without chitinised teeth	7.
4.	Palpi of only 2 distinct segments, the 2nd upturned and hairy; dark species, with conspicuous lateral yellow scaling on mesonotum	**Banksinella**, p. 269.
	Palpi of 3 distinct segments; ornamentation otherwise	5.

5.	Palpi slender, upturned, without distinct hair-tufts; black species, with conspicuous snow-white ornamentation	STEGOMYIA, p. 217.
	Palpi not upturned and with hair-tufts; ornamentation otherwise	6.
6.	Scales on *ppn* broad and flat; lower mesepimeral bristles present (1–3) (except in *periskeletus*)	DICEROMYIA, p. 271.
	Scales on *ppn* narrow; no lower mesepimeral bristles	AËDIMORPHUS, p. 246.
7.	Large yellow, white, and brown mosquitoes with outstanding scales on body and legs, giving them a shaggy and mouldy appearance; wing-membrane clouded in region of c.-vs. 2–3, 3–4, and 4–5, these three being almost in a straight line	MUCIDUS, p. 144.
	Smaller mosquitos, not of shaggy or mouldy appearance, wing-membrane not clouded.	8.
8.	Coxite with projecting basal lobe carrying a long spine, and sometimes an apical lobe also	OCHLEROTATUS, p. 147.
	Coxite without such lobes (if small basal lobe present there is no long, differentiated spine)......................	FINLAYA, p. 153.
9.	Ornate species with pale band on proboscis.	CHRISTOPHERSIOMYIA, [p. 212.
	No marked ornamentation, proboscis without a pale band	10.
10.	Proboscis very long; segment 1 of hind tarsi as long as tibia	RHINOSKUSEA, p. 216.
	Proboscis not unusually long; segment 1 of hind tarsi shorter than tibia.........	11.
11.	Scutellar scales all flat	CANCRAËDES, p. 297.
	Scutellar scales all narrow	AËDES, p. 277.

Key to Larvæ (4th stage).

As *Aëdes* larvæ do not possess well-marked subgeneric characters, one key to all the known larvæ is given. [The known larvæ of *Heizmannia* are also included, as this genus does not differ obviously from *Aëdes* in the larval stage.]

1.	**Mouth-brushes adapted for predaceous habits; both *osc* and *isc* hairs single (unbranched); anal fan of close-set branched hairs extending along whole length of anal segment ventrally ......**	*A.* (*M.*) *scatophagoides*, [p. 146.
	Mouth-brushes not adapted for predaceous habits; *isc* usually of 2–10 branches, but, if both pairs are single, anal fan does not extend along whole of ventral surface of segment	2.
2.	**Abd. seg. VIII with a semicircular chitinised plate on each side, from posterior margin of which the comb-teeth arise ..**	3.
	Abd. seg. VIII without lateral chitinised plates	5.
3.	**Comb of 3 teeth with strong basal lateral denticles ....**	*A.* (*S.*) *desmotes*, p. 227.
	Comb of 5 teeth without basal denticles..	4.

4. Siphonal hair-tuft of 2–3 fine branches; *lh* of 2 subplumose branches; pecten-teeth without denticles .... *A.* (*S.*) *annandalei*, [p. 229.
   Siphonal hair-tuft of 3 subplumose branches; *lh* of 2 simple branches; pecten-teeth with lateral denticles ..... *A.* (*S.*) *mediopunctatus*, [p. 231.

5. Thorax with 2 pairs of large, single, black spines on dorsum; comb-teeth in a patch, siphon normal .... 6.
   Thorax without such spines .... 7.

6. Siphonal hair-tuft modified into a stout spinulose bristle, which may be bifid ... *A.* (*F.*) *elsiæ*, p. 181.
   Siphonal hair-tuft of 3–4 subplumose, or barbed, branches .... *A.* (*F.*) *shortti*, p. 184.

7. Siphon with a ring of spines near apex and a median patch of similar spines on anterior surface .... *A.* (*Aëdim.*) *cæcus*, [p. 258.
   Siphon without such spines .... 8.

8. Comb of 5–19 large teeth in a single row, or of 6–14 teeth in an irregular row, or more or less in 2 rows .... 9.
   Comb of 20–70 teeth, usually small, arranged in several rows, or more or less in a triangular patch .... 33.

9. Antennal shaft with small spicules or spines .... 10.
   Antennal shaft smooth .... 22.

10. The 4–5 pecten teeth nearest base of siphon simple and larger than more distal teeth, which have lateral denticles .... *A.* (*F.*) *novoniveus*, [p. 212.
   All pecten-teeth simple .... *Heizmannia funerea*, [p. 302.
   Basal pecten-teeth with lateral denticles, and smaller, or at least not larger than, more distal teeth .... 11.

11. The 2–3 pecten teeth furthest from base of siphon more widely spaced than those nearer base, and usually distinctly larger than basal teeth .... 12.
   All pecten-teeth evenly spaced and all about same size, those furthest from base being but little larger than remainder . 16.

12. Frontal hairs *B* and *C* both with several branches.......................... 13.
   Frontal hair *B* single (unbranched) ...... 15.

13. All pecten-teeth with lateral denticles, except most distal tooth in some individuals .... 13.
   The most distal 2–3 pecten-teeth without lateral denticles .... *A.* (*Aëdim.*) *vexans* *, [p. 254.

14. Antennal shaft with few minute spicules, and tuft of 3 fairly stout branches, nearer base than apex; comb usually of 10 teeth; pecten-teeth with long sharp point; frontal hairs *B* and *C* each usually 3-branched .... *A.* (*Aëdes*) *indicus*, [p. 284.

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* As figured by Howard, Dyar, and Knab for *Aëdes sylvestris*.

Antennal shaft with fairly numerous strong spinelets, and with tuft of about 5 branches at middle; comb usually of 6–8 teeth; pecten-teeth smaller; frontal hairs *B* and *C* each with usually 5 or more branches .... *A.* (*B.*) *lineatopennis*, [p. 270.

15. Frontal hair *C* with 3–5 branches; siphon 2–2½ times length of diameter at base .. *A.* (*Aëdim.*) *syntheticus*, [p. 257.

Frontal hair *C* single (unbranched); siphon 2½–3 times length of diameter at base .... *A.* (*Aëdim.*) *vexans* *, [p. 254.

16. Frontal hairs *A*, *B*, *C*, and *d* all well developed, and each with a number of fairly long branches .... 17.

Hair *d* much smaller than other 3 pairs, and with few short fine branches ...... 21.

17. Comb of 8–14 teeth arranged irregularly, more or less in 2 rows; siphonal tuft of about 3 fairly long branches at ⅓ length of tube from base; pecten of 16–21 teeth .... *A.* (*F.*) *suffusus*, p. 194.

Comb similar, but pecten of 5–8 teeth.... *Heizmannia covelli*, [p. 305.

Comb of 8–19 teeth arranged in 1 close-set row; siphonal tuft of 4–6 branches at about middle of tube .... 18.

18. Comb of 16–19 teeth, each with fringe from base to apex; siphon about 2½ times length of diameter at base ...... *A.* (*F.*) *niveus* (type- [form), p. 209.

Comb of 8–12 teeth, each fringed not more than half-way from base to apex; siphon 3–5 times length of diameter at base.... 19.

19. Siphon about 5 times length of diameter at base .... *A.* (*F.*) *niveoides*, [p. 211.

Siphon not more than about 3½ times length of diameter at base .... 20.

20. Comb-teeth fringed for about ½ length from base to tip; longer pecten-teeth about ¾ length of larger comb-teeth; siphon about 1 mm. long .... *A.* (*F.*) *alboniveus*, [p. 210.

Comb-teeth fringed at base only; longer pecten-teeth about ½ length of larger comb-teeth; siphon about 0·7–0·8 mm. long.............................. *A.* (*F.*) *albolateralis*, [p. 206.

21. Comb of about 14 teeth in a single row; *isc* 2-branched; pecten of about 16 comparatively small short teeth .... *A.* (*C.*) *thomsoni*, [p. 214.

Comb of about 15–20 teeth irregularly arranged; *isc* of about 12 branches; pecten of about 20 comparatively large and long teeth...................... *A.* (*O.*) *caspius*, p. 149.

22. The most distal pecten-tooth widely spaced from main rank and attached between hair-tuft and apex of siphon.......... *A.* (*S.*) *vittatus*, p. 245.

Pecten-teeth all in one rank, none widely spaced .... 23.

23. Comb-teeth with strong basal lateral denticles .... *A.* (*S.*) *ægypti*, p. 223.

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* Specimens sent by Dr. P. A. Buxton from Samoa.

	Comb-teeth without basal lateral denticles, but usually finely fringed	24.
24.	Frontal hair *C* many-branched, *B* single; comb-teeth in a regular row; pecten with only 5-8 teeth; *isc* 8–10-branched	*A.* (*S.*) *albolineatus*, p. 244.
	Frontal hairs *B* and *C* each 3-branched; comb-teeth irregular; pecten with only 4–5 teeth	*Heizmannia himalayensis*, p. 307.
	Frontal hair *C* single, *B* single or bifid; pecten-teeth more numerous	25.
25.	Comb of 6–10 teeth in an irregular row; pecten of about 18 teeth in a close-set rank; antennal hair of 3–4 branches	*A.* (*O.*) *pulchritarsis*, p. 151.
	Comb-teeth in a single regular row; pecten usually of less than 14 teeth; antennal hair usually single	26.
26.	Pecten-teeth with lateral denticles along one side from base to apex	27.
	Pecten-teeth with basal lateral denticles only; *isc* with at most 3 branches, usually single	30.
27.	*isc* of 3–6 branches	28.
	isc usually single, sometimes split into two	*A.* (*S.*) *pseudalbopictus*, p. 237.
28.	Mesopleural tubercle with short spine; siphonal tuft represented by a single barbed hair at about middle of tube	*A.* (*D.*) *iyengari*, p. 275.
	Mesopleural tubercle with long spine; siphonal tuft usually of 2 branches, nearer apex than base of tube	29.
29.	*isc* of 3 branches	*A.* (*D.*) *micropterus*, p. 276.
	isc of 6 branches	*A.* (*D.*) *reginæ*, p. 277.
30.	Siphon about 3 times length of diameter at base	*A.* (*S.*) *novalbopictus*, p. 237; *A.* (*S.*) *flavopictus*, p. 239.
	Siphon 2–2½ times length of diameter at base	31.
31.	No definite fan-plate on anal segment; a clear area in chitinisation around base of *lh*	*A.* (*S.*) *unilineatus*, p. 242.
	A definite fan-plate on anal segment; no clear area in chitinisation around base of *lh*	32.
32.	Antennal shaft about 6 times length of greatest width	*A.* (*S.*) *scutellaris*, p. 241.
	Antennal shaft about 10 times length of greatest width	*A.* (*S.*) *albopictus*, p. 235.
33.	One or two pairs of frontal hairs single and very long, longer than whole head	34.
	None of the frontal hairs longer than whole head	36.
34.	Frontal hairs *B* and *C* both single and very long	*A.* (*F.*) *gilli*, p. 198.
	Frontal hair *B* very long and single, *C* much shorter and divided into several branches	35.
35.	Dorsal pair of anal papillæ only about length of anal segment, ventral pair shorter, both pairs pointed	*A.* (*F.*) *greeni*, p. 185.
	Dorsal pair of anal papillæ longer than anal segment, the ends rounder	*A.* (*F.*) *christophersi*, p. 195.

36. Several of the more distal pecten-teeth bare, without lateral denticles or fringe, and usually larger than the more basally situated teeth .... 37.

All pecten-teeth with lateral denticles or fringed, and usually all about same size .... 42.

37. Pecten with 2–3 large simple distal teeth markedly detached from the more basal teeth; pecten confined to about basal ½ of tube .... 38.

Pecten either without markedly detached distal teeth or, if with such teeth, the pecten extends for much more than basal ½ of siphon .... 39.

38. Siphon very long, 6–7 times length of diameter at base; antennal tuft of about 20 branches; pecten of 9–13 teeth..... A. (*Aëdim.*) *pallidostriatus*, p. 262.

Siphon about 3 times length of diameter at base; antennal tuft of 8–10 branches; pecten of 14–19 teeth .... A. (*Aëdim.*) *pipersalatus*, p. 260.

39. Dorso-lateral hair [hair 7] of metathorax with 3–4 strong, almost spine-like and barbed branches; 4–5 simple pecten-teeth between hair-tuft and apex of siphon, last 2–3 very large .... A. (*F.*) *saxicola*, p. 191.

Dorso-lateral hair of metathorax not unusually developed; at most 3 simple pecten-teeth between hair-tuft and apex of siphon .... 40.

40. Pecten of 16–19 teeth, two simple ones beyond tuft; *lh* 3–4-branched .... A. (*F.*) *chrysolineatus*, [p. 187.

Pecten of about 10 teeth; *lh* single or double .... 41.

41. Siphon shorter, one or two simple pecten-teeth beyond tuft .... A. (*F.*) *formosensis*, [p. 190.

Siphon longer, no pecten teeth-beyond tuft. A. (*F.*) *harveyi*, p. 189.

42. Siphonal tuft very near apex of siphon and of 3 long branches; antennal tuft of 3–4 branches, nearer base than apex . A. (*R.*) *longirostris*, [p. 216.

Siphonal tuft not usually more than ⅔ of length from base of tube; antennal tuft usually at about middle of shaft or nearer apex than this .... 43.

43. Frontal hair *d* unusually well developed and as large as *A*, *B*, and *C*, these four hairs each with a number of branches; pecten-teeth fringed on both sides and at tip, as in *Uranotænia* .... A. (*F.*) *albocinctus*. [p. 173.

Frontal hair *d* comparatively very small; pecten-teeth otherwise .... 44.

44. Pecten of about 12 teeth, either unusually long and slender, and fringed along one side, or unusually short and stout, with one strong basal denticle.............. 45.

Pecten-teeth nearly always more than 12 in number, and not formed as above ... 47.

45. Pecten-teeth long and slender and fringed along one side from base to apex ...... 46.

Pecten-teeth unusually short and broad, with one strong basal denticle; antennal shaft smooth .... *A.* (*F.*) *unicinctus*, [p. 171.

46. Antennæ long and blackish; no obvious stellate hairs on thorax or abdomen; margin of anal saddle almost smooth .. *A.* (*Aëdim.*) *nummatus*, [p. 266.

Antennæ short and pale; conspicuous many-branched stellate hairs on thorax and abdomen; margin of anal saddle very spiny .... *A.* (*F.*) *poecilus*, p. 158.

47. Frontal hairs *B*, *C*, and *d* all placed well forward towards front margin of clypeus, and standing more or less in transverse line, and each with 3 or more branches .. 48.

Frontal hairs *B*, *C*, and *d* placed further back towards middle of clypeus; *B* and *C* usually single and standing one in front of the other .... 50.

48. Antennal shaft with small spicules; *isc* usually 4-branched .... *A.* (*F.*) *pulchriventer*, [p. 200.

Antennal shaft smooth; *isc* usually 2-branched .... 49.

49. Abdominal segments with stellate hairs; comb of 50–60 teeth .... *A.* (*F.*) *macdougalli*, [p. 177.

Abdominal segments without stellate hairs; comb of 40–45 teeth .... *A.* (*F.*) *pseudotæniatus*, [p. 179.

50. Frontal hairs *B*, *C*, and *d*, all close together; antennal shaft comparatively long.............................. *A.* (*F.*) *dissimilis*, [p. 204.

Frontal hairs *B* and *C* well separated; antennal shaft not so long .... 51.

51. Frontal hair *B* with about 4 branches (compare also *A.* (*O.*) *pullatus*, p. 152) .. *A.* (*F.*) *oreophilus*, [p. 192.

Frontal hair *B* single .... 52.

52. Antennal shaft with small spines; antennal hair with 4 or more branches .... *A.* (*O.*) *caspius*, p. 149.

Antennal shaft smooth; antennal hair usually single .... 53.

53. Preclypeal spines comparatively stout and blunt-ended .... 54.

Preclypeal spines inconspicuous, rather long, and tapering to a fine point ...... 57.

54. Frontal hair *d* nearer to *C* than to *B*..... 55.

Frontal hair *d* nearer to *B* than to *C*, or the 3 hairs placed one behind the other at fairly even wide intervals........... 56.

55. *isc* of about 8 fairly long subequal branches *A.* (*F.*) *khazani*, p. 168.

isc of 2 long branches .... *A.* (*F.*) *assamensis*, [p. 166.

56. Frontal hair *d* near to *B* than to *C*; *isc* of 3–4 fairly short branches .... *A.* (*F.*) *deccanus*, p. 163.

Frontal hairs *B*, *C*, and *d* placed one behind the other at fairly even, wide intervals; *isc* of 3–6 long fine branches. *A.* (*F.*) *feegradei*, [p. 165.

57. Median hairs of mouth-brushes with very small serrations; antennal shaft from 0·41–0·51 mm. long .... *A.* (*F.*) *gubernatoris* [(type-form), p. 161.

Median hairs of mouth-brushes with comparatively very large serrations; antennal shaft from 0·32–0·35 mm. long... *A.* (*F.*) *gubernatoris* [var. n. *kotiensis*, [p. 161.

Subgenus **MUCIDUS** Theobald, 1901.

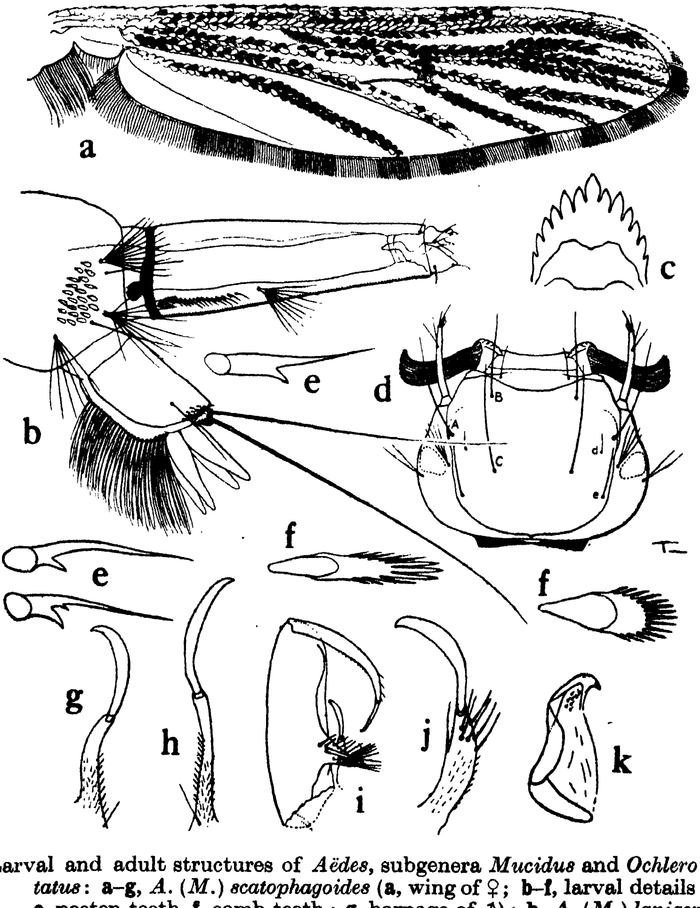
M.C. i, p. 268. Genotype, *Culex alternans* Westwd.

Pardomyia Theobald, 1907, M.C. iv, p. 280. Genotype, *P. aurantia* Theo.

Ekrinomyia Leicester, 1908, Cul. Malaya, p. 71. Genotype, *E. aureostriata* Leic.

ADULTS *.—Large mosquitoes, with outstanding yellow, white, and brown scales on body and legs, giving them

Fig. 34.



Larval and adult structures of *Aëdes*, subgenera *Mucidus* and *Ochlerotatus*: **a–g**, *A.* (*M.*) *scatophagoides* (**a**, wing of ♀; **b–f**, larval details; **e**, pecten-teeth, **f**, comb-teeth; **g**, harpago of ♂); **h**, *A.* (*M.*) *laniger*, harpago of ♂; **i–k**, *A.* (*O.*) *caspius*, ♂ coxite, with appendages, harpago, and proctiger in side view.

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* Barraud 1929*a*, p. 1052; Edwards 1932, p. 133; Barraud & Covell 1928, p. 676 (buccal cavity).

a mottled and mouldy appearance. Some of the white scales on mesonotum remarkably long and twisted, resembling strands of cotton-wool *. Wings mottled with yellow, brown, and creamy scales; membrane usually slightly clouded in region of c.vs. 2–3, 3–4, and 4–5, these three being approximated and almost in line, though 4–5 may be slightly nearer tip of wing than the other two. *ppn* bristles numerous, usually about 20.

Hypopygium in both sexes as in *Ochlerotatus*.

LARVA.—Mouth-brushes forming strong, matted tufts; the hairs slightly reduced in number (50–70) and thickened, but not specially modified, serrations of inner margin about as strong as in many other species of the genus. Both *isc* and *osc* single. Anal fan of close-set branched hairs extending along whole length of segment ventrally (an unusual character in Culicine larvæ); compare the similar condition in the predaceous subgenus *Lutzia* of *Culex*). Frontal hairs all single, their arrangement unusual, *d* being apparently considerably external to *B* and *C*.

DISTRIBUTION and BIONOMICS.—Only about seven species are known, and these are confined to the tropics of the Old World, from West Africa to Melanesia. Two are known in India, one having a very wide distribution, the other being rare. The ♀ usually carries the abdomen curved forwards beneath the thorax. The larvæ live in open natural pools and are predaceous on other mosquito larvæ.

60. **Aëdes (Mucidus) scatophagoides** Theobald, 1901.

M.C. i, p. 277. TYPE-LOC.: Myingyan, Burma (*E. N. Watson*), and Moradabad, N.W.P. (*Major Close*). TYPE: 2 ♀♀ co-types in Brit. Mus.

ADULT †.—A large species, distinguished on subgeneric characters given above, and by leg-markings and relatively short hind tarsi. Wing 5·5–6·5 mm.

♀.—Proboscis mainly yellow, with a variable amount of white scaling in middle. Palpi rather more than ½ length of proboscis, shaggily clothed with dark brown, yellow, and white scales. *Thorax* with light matt grey integument, mesonotal scales light brown and white, latter in long tufts. Costa of *wing* mainly yellow in some specimens, in others

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* [The peculiarities of scaling mentioned above are found in the two Indian species, but the third Oriental species (*A. aurantius* Theo., widely spread from Malaya to Queensland, and quite possibly occurring in Burma) has normal scaling of the head, body, and legs, and very different colouring. It is a dark brown mosquito with tip of abdomen broadly golden; hind tarsi dark with narrow yellow rings and fifth segment conspicuously whitish; wings nearly bare.]

† Edwards 1911, p. 246, and 1922 *d*, p. 450; Barraud 1929 *a*, p. 1053.

dark scaled from base for some distance, but there is usually a large yellow streak towards apex of wing extending on to vein 1. *Legs*: brown, with numerous white rings, including three on each tibia (at base, middle, and tip) and two on the first segment of each tarsus (at base and middle), segments 2–5 of hind tarsus each with a white basal ring. First hind tarsal segment barely ¾ length of tibia. *Abdomen* with brown and white scales, latter predominating, especially towards tip.

♂.—Resembles ♀ except that antennæ are densely plumose, the hairs being yellow, and arising chiefly from two sides of the shaft, not in regular whorls. Palpi longer than proboscis by about length of last two segments, which are enlarged and spatulate; apical ⅓ of palp with dense hair-tufts. Mesonotal scales often lighter than in ♀, sometimes almost entirely white. *Hypopygium* (fig. 34): coxite moderately long, with basal lobe bearing a number of hairs. Style fairly long, with rather short terminal appendage. Harpago well developed, with curved blade about the length of stem. Phallosome scoop-shaped, without lateral plates or teeth.

LARVA * (fig. 34).—*Head* comparatively large. Mouth-brushes adapted for seizing prey, and consisting of a number of slightly hooked lamellæ, with serrations along one side apically. Frontal hairs all simple and inconspicuous, arranged as shown in fig. 34, **d**. Antenna comparatively short, shaft smooth; hair-tuft of 3–4 branches at only a short distance from tip. Mandibles very strong, teeth black. Mentum with 13–15 strong teeth, in almost a straight row. Lateral tufted hairs of *thorax* moderately developed, some hairs on dorsum single and long. *Comb* of 30–35 teeth in a patch, each tooth ending in several points. *Siphon* about 2 mm. long, and about 5 times length of diameter at base. Pecten of 22–25 teeth, extending along nearly basal ½ of tube, each with one or two lateral denticles and a long fine point. Hair-tuft of 6–10 fairly strong barbed branches at about middle of tube. *Anal segment* enclosed, except ventrally, within chitinisation; some strong spines on posterior margin towards dorsum. Both *isc* and *osc* usually single and fairly long. Anal fan of numerous (about 28) rather short branched hairs, extending along entire length of segment ventrally (a somewhat unusual feature in larvæ of Indian mosquitoes). Papillæ pointed and abont length of segment.

HABITAT.—Open natural pools, chiefly during rainy season.

DISTRIBUTION.—Widely distributed from RAJPUTANA to BURMA, and through CENTRAL PROVINCES and MADRAS to CEYLON.

Occurs throughout tropical Africa, but apparently not further east than Burma.

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* Christophers 1906, p. 13; Bedford 1919, p. 739.

61. **Aëdes (Mucidus) laniger** (Wiedemann), 1821.

Culex laniger, Dipt. Exot. p. 9 (♀). TYPE-LOC.: Java. TYPE: ♀ in Copenhagen Mus.

ADULT ♀ *.—Very similar in appearance to *M. scatophagoides*, but no white median ring on front or middle tibiæ, that on hind tibia less distinct and may be absent; all tibiæ more broadly white at tip; front and middle tarsi wholly ochreous-brown; hind tarsi with segment 1 fully as long as hind tibia, brown, except for a narrow white ring at base, 2 wholly brown, 3–5 whitish, with tips narrowly brown.

♂.—Differs from that sex of *M. scatophagoides* as in ♀; palpi less spatulate apically. *Hypopygium* (fig. 34): very similar to that of *M. scatophagoides*, but both stem and blade of harpago longer, and blade less curved.

LARVA.—Unknown.

DISTRIBUTION. ASSAM † (?): two ♂♂ in M.S.I. collection (*Christophers*). CEYLON: Trincomali, iv. 1915 (*C. F. Baker*). Known also from Malayan region as far east as Philippine Islands.

Subgenus **OCHLEROTATUS** Lynch Arribalzaga, 1891.

Rev. Mus. La Plata, ii, p. 143. Genotype, *O. confirmatus* L. A. (=*scapularis* Rond.).

ADULT ‡.—Apart from the structure of the ♂ hypopygium, this subgenus is difficult to separate from *Aëdimorphus*, the structure of the ♀ hypopygium, the general appearance, and scale-structure being similar. In most species, however, lower mesepimeral bristles are present. Scales on vertex of head and on scutellum always narrow. Proboscis rather slender, and longer than fore femur. Palpi of ♂ about length of proboscis, last two segments more or less thickened, hairy, and turned slightly downwards. Plume-hairs on ♂ antenna directed mainly dorsally and ventrally. Segment VIII of ♀ abdomen completely retractile; cerci long and narrow, and usually, in dried specimens, projecting from the hollow ring of VII, as in *Aëdimorphus*. Coxite of ♂ hypopygium with basal lobe, and usually apical lobe also; basal lobe carrying a long spine. Style long and slender, with terminal appendage. Harpago present, consisting of stem and blade, as in *Mucidus* and *Finlaya*. Phallosome not divided into lateral plates and without teeth, as in *Finlaya*.

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* Edwards 1922 *a*, p. 451; Barraud 1929 *a*, p. 1053; Leicester 1908, p. 69 (as *M. mucidus*).

† Specimens examined by Author. Probably from Assam, but no label attached giving locality.

‡ Edwards 1932, p. 135; Barraud 1928 *a*, p. 655; Barraud & Covell 1928, p. 676 (buccal cavity).

LARVA.—Those of only two Indian species are at present known. In both the comb consists of 6–20 teeth irregularly arranged; pecten of 18–20 teeth in a close-set rank, none of the distal teeth being widely spaced, as is the case in most species of *Aëdimorphus*.

DISTRIBUTION and BIONOMICS.—Although over 100 species of the subgenus have been described, only a very few are known from the Indian region at present; these are all confined to the North-West Frontier and Kashmir, and represent intrusions from the Palæarctic region *.

The larva of *A.* (*O.*) *caspius* (like those of the majority of Palæarctic species) lives in ground-pools, but that of *A.* (*O.*) *pulchritarsis* has been found in tree-holes. The adult ♀♀ readily attack man and are often troublesome.

62. **Aëdes (Ochlerotatus) caspius** (Pallas), 1771.

Reise versch. Prov. Russ. Reichs. i, p. 475 (*Culex*) (♀ ?). TYPE-LOC.: shores of Caspian sea. TYPE: non-existent.

(For synonymy and varieties *vide* Edwards, 1932.)

ADULT †.—Distinguished by speckled wings and creamy rings over tarsal joints. Wing about 4 mm.

♀.—*Head*: dorsum thickly covered with white and fawn, narrow and upright scales, the white scales continued forwards between eyes. Tori with white scales on inner side. Clypeus pale brown. Palpi mottled with light and dark scales. Proboscis either mainly pale or mottled, but tip usually dark, for a varying distance in different specimens. *Thorax*: mesonotum densely clothed with fawn-coloured scales and with white scales forming a pair of more or less defined submedian stripes, running from front, back to scutellum; latter with narrow pale scales and yellow bristles. Broad white scales covering larger part of pleuræ. *Wings*:

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* In addition to the three species described here, it is certain that others occur in Baluchistan and parts of northern Kashmir. A few ♀♀ have been received from there, collected by Colonel L. G. Browse, I.M.S., at elevations from 7,300′ to 14,000′ above sea-level. Some of these specimens resemble *A.* (*O.*) *cataphylla* Dyar, but in the absence of ♂♂ an identification cannot be made with certainty, and it seems inadvisable to add this species to the Indian list until more material has been obtained. [Two females of another species, probably undescribed, were collected at an altitude of over 15,000′ in Kashmir by G. Evelyn Hutchinson in August 1932. These have almost all the abdominal scales cream-coloured, and are peculiar in having no lower mesepimeral bristles; the tarsi are dark, also costa of wing.]

† Edwards 1921 *c*, p. 299, and 1926, p. 422; Kirkpatrick 1925, p. 97; Barraud 1928 *a*, p. 668; Martini 1930, p. 271.

speckled with light and dark scales, the white scales usually predominating in Indian specimens. *Legs*: very pale, speckled with dark scales; tarsi with apical and basal pale rings, segment 5 of hind tarsi pale. *Abdomen*: tergites thickly covered with pale fawn, white, and dark brown scales in varying proportions and arrangement. Sternites entirely pale.

♂.—Markings as in ♀. Palpi a little longer than proboscis, distinctly thickened on apical ½; marked with white, fawn, and brown scales: last two segments with tufts of yellow hairs. Antennal plumes dense, yellow. *Hypopygium* (fig. 34, i): coxite with pronounced basal lobe carrying a strong bristly spine with hooked tip, one short spine, and a small number of flattened straight bristles; no very pronounced apical lobe. Stem of harpago of moderate length and hairy; blade about same length as stem.

PUPA *.—With the characters noted above for the genus. Lateral tuft on seg. VIII short, with about 8 branches; paddle wholly pale, with fringe extremely short and fine, terminal hair ⅙ length of paddle, and may be single, double, or triple.

LARVA †.—*Head* moderately chitinised, some darker patches posteriorly. Antenna moderately long, slightly curved; shaft with spinelets, those on apical ½ strong, this part of antenna also darker than basal ½; tuft of about 6 branches, arising at about middle of shaft Frontal hair *A* with 8–10 branches, *B* and *C* usually single and subplumose; *C* standing almost directly behind *B*; *d* small, with several fine branches. Mouth-brushes normal. Preclypeal spines long and slender. Mentum triangular, about 10 moderately large teeth either side of central one. Lateral hairs of *thorax* and *abdomen* well developed. *Comb* of 15–20 teeth, each ending in a number of sharp points. *Siphon* about 1 mm. long, pale in colour, with narrow dark ring at base. Acus fairly large. Pecten of about 20 fairly long, pointed teeth, each with 3–6 lateral denticles near base. Hair-tuft of 4–6 branches at rather beyond middle point from base. *Anal segment* with chitinised saddle covering dorsum and sides and with large fan-plate ventrally. Surface of saddle (and of siphon) with numerous minute sharp points; *lh* single; *isc* with a number of subequal branches. Fan hairs numerous and moderately long. Anal papillæ ⅓–½ length of segment, tips pointed (length subject to variation).

HABITAT.—Open natural pools, both fresh water and brackish.

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* Theodor 1924, pp. 341–5; Kirkpatrick 1925, p. 83.

† Lang 1920, p. 60; Wesenberg-Lund 1921, p. 39; Kirkpatrick 1925, p. 82; Martini 1930, p. 272; Montschadsky 1930, p. 596.

DISTRIBUTION.—KASHMIR: Baltistan, Bragica, 7,300′, viii. 1923 (*Browse*). N.W. FRONTIER: Peshawar, iii. 1913 (*Howlett*); x. 1914 (*Fletcher*); Taru, Peshawar dist., v. 1916 (*Fletcher*); Nowshera, Peshawar dist., vi. 1911 (*Smith*); Rawalpindi, vi.–vii. 1917 (*Hodgart*). Following from Cent. Mal. Bureau records:—Bannu, vii. 1925; Chaman, vi. 1928; Dera Ismail Khan, 1929.

Known also from EUROPEAN COASTS, CENTRAL EUROPE, and eastwards to GOBI DESERT, NORTH AFRICA, PERSIAN GULF, and MESOPOTAMIA.

63. **Aëdes (Ochlerotatus) pulchritarsis** (Rondani), 1872.

Bull. Soc. Ent. Ital. iv, p. 31 (*Culex*). TYPE-LOC.: Italy. TYPE: Florence Museum.

[ADULT *.—Distinguished by the dark wings and pure white rings extending over the hind tarsal joints, the 5th segment being entirely white †. Wing 3–4·5 mm.

♀.—*Head*: a median line of long and rather wide white lanceolate scales on vertex, continued forwards between eyes and around eye-margins; white upright scales in centre of nape; a large patch of black scales on either side of middle line of vertex. Palpi about ¼ length of proboscis, black, with conspicuously white-scaled tips. Proboscis black, with a few grey scales over middle ½ on underside. *Thorax*: mesonotum with a variable amount of golden scales towards front in middle; pale scales along margins and over wing-roots, remainder dark brown. Scutellar scales narrow and mostly white; *apn* with white lanceolate scales, *ppn* with some dark scales anteriorly, flat white scales posteriorly; 4–5 lower mesepimeral bristles. *Wings*: dark scaled, plume-scales long and narrow. *Legs*: mostly black, with conspicuous white knee-spots and white rings on tarsi, narrow on front and middle pairs, broader on hind pair; 5th tarsal segment of all legs white. *Abdomen*: black, with white basal bands on tergites II–VI, sternites similarly coloured.

♂.—No specimens available. *Hypopygium* with *bl* small, bearing one distinct spine.

LARVA ‡.—See under var. *asiaticus*.

HABITAT.—Tree-holes.

DISTRIBUTION. Chiefly SOUTHERN EUROPE, but extending into TURKESTAN and KASHMIR.

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* Edwards 1921, p. 1031; 1926, p. 429, and 1932, p. 141 (syn. and vars.); Barraud 1928 *a*, p. 668; Martini 1930, p. 316.

† [In ornamentation this resembles some species of subgenus *Finlaya*, especially *A.* (*F.*) *greeni*, but may be distinguished by the long cerci and small sternite VIII in ♀.]

‡ Montschadsky 1926, p. 151, and 1930, p. 609; Vogel 1929, p. 161; Martini 1930, pp. 317–319.

The species is usually scarce and still but little known, but appears to be subject to considerable local variation. Two different varieties, or possibly distinct species, occur within the Indian area and are described below.]

[var. **asiaticus** Edwards, 1926.

Riv. Malar. v, p. 430 (14. x. 1926). TYPE-LOC. : Drosh, Chitral, x. 1915 (*W. O. Walker*). TYPE : ♀ in Brit. Mus.

stegomyina Stackelberg & Montschadsky, Bull. Ent. Res. xvii, p. 151 (15. x. 1926). TYPE-LOC. : Katta-Kourgan, Turkestan. TYPE : Leningrad (?).

ADULT ♀.—Mesonotum mainly dark brown, with a double median line of white scales on anterior ½, narrowly bordered externally with yellow scales ; on each side of the posterior end of this stripe a rather large patch of whitish scales. White basal bands on tergites II–VI complete, that on VI very narrow. Femora and tibiæ with fairly numerous scattered white scales ; hind femur (except for this speckling) dark on nearly the whole outer surface.]

LARVA *.—Antennal shaft smooth, hair-tuft of 3–4 hairs at about middle. The four pairs of frontal hairs, *A* to *d*, all with moderately long branches, and all placed rather far forward on clypeus. Hairs on *thorax* and *abdomen* well developed, those of dorsum of abdomen of stellate form. *Comb* of 6–10 large pointed teeth, fringed on basal ½, arranged in an irregular row. *Siphon* dark, about 1 mm. long by 0·3 mm. broad at base, slightly tapering from middle to apex. Pecten of about 18 teeth in close-set row, each with 3–6 basal lateral denticles. Siphonal tuft 3–4-branched, at about middle of tube. *Anal segment* with small chitinised saddle ; *lh* single, fairly long ; *isc* of about 5 subequal branches of moderate length. Fan of a small number of 2-branched hairs arising from plate. Papillæ very long, ¼ length of whole body and about twice length of siphon, sausage-shaped, with rounded ends.

DISTRIBUTION.—Apart from type-localities, recorded only from Old Bokhara (*Montschadsky*).

var. **versicolor** Barraud, 1924 †.

Ind. Journ. Med. Res. xii, p. 73 (*Finlaya versicolor*) (♀). TYPE LOC. : Yusimarg, Kashmir, 7500′, viii. 1923 (*T. B. Fletcher*). TYPE : ♀ in Brit. Mus.

ADULT ♀.—Mesonotum with a broad median yellowish patch on anterior ½, not including a white central line;

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* Montschadsky 1926, p. 151, and 1930, p. 609.

† [This differs very little from var. *berlandi* Séguy, 1921, found in the neighbourhood of Paris. The French form (according to a somewhat damaged ♀ in the British Museum) appears to have the white rings of the hind tarsi broader.]

indefinite patches of yellowish scales on each side of the median patch behind. White basal bands on tergites II–VI complete and very distinct. Femora and tibiæ without any scattered pale scales; hind femur on outer side with basal ½ whitish, apical ½ black; a dark dorsal line runs almost to base. White rings on hind tarsi narrow, even that on 1–2.

LARVA.—Unknown.

DISTRIBUTION.—Known definitely only from type-locality.

[64. **Aëdes (Ochlerotatus) pullatus** (Coquillett), 1904.

Proc. Ent. Soc. Wash. vi, p. 168 (*Culex*) (♂♀). TYPE-LOC.: Kaslo, British Columbia (*H. G. Dyar*). TYPE: U.S. National Mus.

Aëdes pullatus Howard, Dyar, and Knab, 1917, Mosq. N. & C. Amer. iv, p. 738.

ADULT *.—Characterized by dark tarsi and hypopygial structure. Wing about 5 mm.

♂.—*Head*: with pale yellowish narrow scales. Palpi thin, slightly shorter than proboscis, last two segments and the slightly swollen tip of long segment with a moderate number of long hairs. *Thorax* clothed with pale yellowish scales, few or no darker ones on mesonotum. Lower mesepimeral bristles few in number (apparently only one on one side, none on the other, in the Kashmir specimen). *Wings*: dark scaled. *Legs*: mainly dark, femora pale beneath and with some pale speckling. *Abdomen*: blackish above, tergites with whitish basal bands widening out at sides. *Hypopygium*: coxite with well-marked apical lobe; rather numerous long hairs on outer side and near tip on inner side, but no definite hair-tufts; basal lobe very small, with one strong spine directed at right angles to axis of coxite, and at some distance from the spine a pair of curved bristles, on a small eminence. Harpago with rather long curved stem and broad blade; basal part of stem pubescent, with a more or less prominent angle or shoulder on inner side at some distance from base.

♀ (American specimens).—Colouring as in ♂; rather more pale scales on tibiæ and at bases of tarsi. Often dark stripes present on mesonotum.

LARVA (American specimens).—Antennæ covered with spicules, tuft just before middle. Frontal hair *B* with about 4 branches; *C* with about 8, placed behind *B*; *d* small. Comb with numerous teeth. Siphon about 3×1, tuft near middle. pecten of numerous and uniformly spaced teeth. Anal papillæ very long and pointed.

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* Edwards 1921 *c*, p. 316, and 1926 *b*, p. 449.

HABITAT (in America).—Pools formed by melting snow, in mountains in spring.

DISTRIBUTION.—KASHMIR: Gulmarg, vi. 1931 (*T. B. Fletcher*), 1 ♂ *.

Also widely spread in mountains of CENTRAL and SOUTH EUROPE and WESTERN NORTH AMERICA.]

Subgenus **FINLAYA** Theobald, 1903.

M.C. iii, p. 281. Genotype, *F. poicilia* Theo.

Finlayia Giles (emend.), 1904, Journ. Trop. Med. vii, p. 366.

Danielsia Theobald, 1904, Entom. xxxvii, p. 78. Genotype, *D. albotæniata* Theo.

Hulecœteomyia Theobald, 1904, Entom. xxxvii, p. 162. Genotype, *H. trilineata* Theo.

Popea Ludlow, 1905, Can. Ent. xxxvii, p. 95. Genotype, *P. lutea* Ludl.

Phagomyia Theobald, 1905, Gen. Insect., Fam. Culicidæ, p. 21. Genotype, *P. gubernatoris* (Giles).

Lepidotomyia id., ib. p. 22. Genotype, *L. magna* Theo.

Pseudocarrollia Theobald, 1910, Rec. Ind. Mus. iv, p. 13. Genotype, *P. lophoventralis* Theo.

ADULT †.—Rather small or medium-sized mosquitoes of very varied ornamentation and scaling. Some species resemble those of the subgenus *Stegomyia*, being black with white markings; these may be distinguished on the points given under that subgenus. In others the mesonotum is ornamented with fine lines of white or yellow scaling, and in some there is a pale band, or pale scaling to a greater or less extent, on the proboscis. Some other species are much less ornamented. Proboscis usually longer than fore femur. Palpi of ♂ from rather more than ½ to fully as long as proboscis. Palpi of ♀ from ⅙ to ¼ length of proboscis. Antenna of ♂ much as in *Stegomyia*. Tarsal claws of fore and mid-legs toothed in both sexes. No lower mesepimeral bristles. In the ♀ segment VIII is only slightly retractile and laterally compressed, the sternite large and usually without scales, and the cerci quite short. Coxite of ♂ hypopygium long and usually without lobes. Style fairly long and simple, with usually a long terminal appendage. Harpago well developed, with stem and flattened blade (except in *dissimilis* and *subsimilis*, in which the stem is short and the harpago represented by a stout bristle). In a few species (*albolateralis*, *niveus*, *pulchriventer*, etc.) there is a row or tuft of very large scales on ventral border of coxite towards apex. Phallosome tube-like or scoop-shaped, not divided into lateral plates, sometimes with serrations on apical rim, but no definite chitinised teeth as in *Stegomyia*. Paraprocts with 2–3 teeth at crown and a few minute hairs just below (characters absent in *Stegomyia*).

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* [This Kashmir specimen has rather broad and flat scales on *apn*, *ppn*, and mid-lobe of scutellum, these being normally quite narrow, but the hypopygial structure is almost or quite identical with North American *pullatus*. Until more material is forthcoming it is impossible to determine whether the Kashmir form is a distinct local variety.]

† Edwards 1932, p. 147. See also Barraud 1923 *g*, p. 476, and 1924 *a*, p. 845.

LARVA (4th stage).—Antenna usually fairly short and with or without spicules on shaft. Antennal hair single or with a few branches. Frontal hairs very variable in arrangement and character. Occasionally the four important pairs are all well developed and many-branched (*albolateralis*, *albocinctus*, *suffusus*). In another group, hairs *A*, *B*, and *C* have several rather short branches, *B* and *C* being placed well forward towards the front margin of clypeus (*pulchriventer*, *elsiæ*, *pseudotæniatus*, *shortti*, etc.). In *christophersi*, *gilli*, and *greeni* hairs *B* and *C* are placed further back and close together, and one or both may be very long, as long as the whole head. In a number of other species (*gubernatoris* group) hairs *B* and *C* are placed one behind the other, both usually single, and of moderate length. Chætotaxy of thorax and abdomen of variable development; in a few species large spines are present on dorsum of thorax. Comb nearly always a triangular patch of numerous scale-like teeth, but in *albolateralis*, *niveus*, and *suffusus* there are fewer large teeth arranged more or less in a single row, as in *Stegomyia*. Siphon of only moderate length, with a single pair of hair-tufts near middle. Acus nearly always present. Pecten well developed, usually of close-set teeth with lateral denticles; in a few species there are some larger simple teeth towards apex of tube. A chitinised saddle on anal segment; anal fan only moderately developed.

DISTRIBUTION and BIONOMICS.—The subgenus has a world-wide distribution, but attains its greatest development in the Oriental region, where about 50 species are known out of a total of about 92. In the Indian region about 38 species occur, and it is most probable that this number will be increased by further collecting. About half the known species are found in the Himalayas. The larvæ live either in tree-holes or bamboo-stumps during the monsoon periods, or in rock-pools and potholes in stream-beds. Some of the commoner species, such as *albolateralis*, are very persistent blood-suckers in the day-time, and cause much annoyance in certain forest localities. No species is known to transmit disease.

Key to Adults.

1.	Wings elaborately spotted and speckled with black and white scales	*poecilus*, p. 157.
	Wings not spotted or speckled, wing-scales all dark, except for a short line of pale ones at base of costa in some species	2.
2.	Tarsi entirely dark	3.
	Tarsi with white markings	7.
3.	Mid-femur with a median silvery mark on anterior surface	*dissimilis*, p. 204.
	Mid-femur without such mark	4.
4.	Mesonotum with a large snowy-white patch in front, which may, in the ♀, be more or less divided into lateral patches	*niveus* group, [pp. 205–212.
	Mesonotum with ochreous, yellow, or golden scales	5.
5.	Abdominal sternites with orange patches	*pulchriventer*, p. 199.
	Abdominal sternites without orange patches	6.
6.	Mesonotum, in ♀, black, with ochreous scales arranged in lines; in ♂ entirely, but sparsely, covered with pale scales	*oreophilus*, p. 192.
	Mesonotum covered with ochreous scales, with a pair of indistinct submedian dark lines	*suffusus*, ♀, p. 194.
7.	Hind tarsi with one or more white rings at bases of segments only	8.
	Hind tarsal segments with both apical and basal white rings	23.
8.	Venter of abdomen with orange markings.	*auronitens*, p. 202.
	Venter of abdomen without orange markings	9.
9.	Hind tarsi with only one white ring	*unicinctus*, p. 170.
	Hind tarsi with three or four white rings	10.
10.	Hind tarsi with three white rings	11.
	Hind tarsi with four white rings	20.
11.	Mesonotum marked with narrow lines of golden scales	12.
	Mesonotum marked otherwise	16.
12.	Proboscis with a pale ring or with pale scaling on underside	13.
	Proboscis entirely dark	*saxicola*, p. 191.
13.	Proboscis with pale scaling both on upper and undersides	14.
	Proboscis pale on underside only	15.
14.	Proboscis pale on basal $\frac{4}{5}$ both on upper and undersides	*pallirostris*, ♀, p. 190.
	Proboscis extensively pale on underside and with white scaling forming a narrow band on upper side	*chrysolineatus*, p. 185.
15.	Mid-femur dark on anterior aspect	*harveyi*, p. 188.
	Mid-femur with a pale line on basal $\frac{1}{2}$ anteriorly	*formosensis*, p. 189.
16.	Mesonotum blackish, with a white spot in front	*stevensoni*, p. 174.
	Mesonotum otherwise	17.

17. All femora with small white knee-spots, scales on dorsum of head mainly narrow .... *christophersi*, p. 195.
All femora dark at knee, scales on dorsum of head mainly broad and flat .... 18.
18. Posterior, or under, surface of fore tibia conspicuously pale for whole length .... *gilli*, p. 196.
Fore tibia dark, except narrowly at base .. 19.
19. Mid-femur dark on anterior surface, except at extreme base .... *simlensis*, p. 198.
Mid-femur with a well-defined white streak on anterior surface, ventrally, on basal ½. *albocinctus*, p. 172.
20. Hind tarsi with white ring on segment 4 very wide and covering nearly the whole segment .... *subsimilis*, p. 203.
Hind tarsi with white ring on segment 4 not very wide .... 21.
21. Mesonotum with a large area of white scaling in front .... *albotæniatus*, p. 174.
Mesonotum dark, or with pale scaling forming lines .... 22.
22. Mesonotum dark on anterior ½, or with an indistinct median yellow line .... *albotæniatus* var. *mikiranus*, ♀, p. 176.
Mesonotum with a median and sublateral lines of white or creamy scales .... *shortti* *, p. 183.
23. Mesonotum with a white patch in front .. 24.
Mesonotum without a white patch in front 33.
24. Venter of abdomen with very long outstanding tufts of scales .... 25.
Venter of abdomen with only moderately developed tufts of outstanding scales or with none .... 26.
25. *ppn* bare .... *khazani*, p. 168.
ppn with white scales .... *prominens*, p. 169.
26. *ppn* with only a small patch of white scales on posterior border .... 27.
ppn with a large patch of white scales .. 29.
27. Venter of abdomen with moderately developed tufts of outstanding scales .. 28.
Venter of abdomen without tufts of outstanding scales .... *cogilli*, p. 165.
28. Fore tibia dark on posterior surface, except for an apical white ring; scutellum densely clothed with flat white scales; fore femur dark on upper, or dorsal, surface at apex .... *lophoventralis*, p. 167.
Fore tibia pale posteriorly for whole length; scutellum much less densely clothed with white scales; fore femur with a white spot at apex on upper, or dorsal, surface. *cacharanus*, p. 166.
29. Scutellar scales brownish-black .... 30.
Scutellar scales mainly white .... 32.
30. Head without a median white-scaled line in ♀ .... *feegradei*, p. 164.
Head with a median white-scaled line ... 31.

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* Hind tarsi with some white scales at apices of first 3 segments not forming definite basal and apical rings.

31.	Abdomen with small outstanding tufts of scales on venter and roughened scales on dorsum	*assamensis*, ♀, p. 166.
	Abdomen without obvious tufts of outstanding scales	*deccanus*, p. 163.
32.	Venter of abdomen with small outstanding tufts of scales; mesonotum almost entirely covered with white scales	*assamensis*, ♂, p. 166.
	Venter of abdomen without tufts of outstanding scales; white scales of mesonotum confined to an anterior patch and one in front of each wing-root......	*gubernatoris*, p. 159.
33.	Mesonotum marked with lines of white, yellowish, or golden scales on a dark ground	34.
	Mesonotum covered with ochreous, brown, or golden scales, not arranged in lines...	38.
34.	Proboscis entirely dark	35.
	Proboscis with pale scaling on undersurface	37.
35.	Mesonotum with a line of creamy scales each side, continued over wing-root, no median line, but three small patches of pale scales on anterior margin	*sintoni*, p. 200.
	Mesonotum with median and lateral well-defined lines of white or golden scales; no patch of scales on anterior border of mesonotum................	36.
36.	Pale lines on mesonotum white or creamy; femora with white longitudinal lines for whole length	*pseudotæniatus*, p. 178.
	Pale lines on mesonotum golden, femora not lined with white	*greeni* var. *kanaranus*, [p. 185.
37.	Proboscis pale on underside for basal ⅔; pale lines on mesonotum very narrow, clearly defined and golden	*macdougalli*, p. 177.
	Proboscis pale beneath from near base to tip, except for a small interruption at about ¾ from base; lines on mesonotum pale yellow, the median one formed of two lines of scales placed close together.	*elsiæ*, p. 180; *cf.* also [*shortti*, p. 183.
38.	Last segment of hind tarsi white dorsally; mesonotal scales bright golden.........	*greeni*, p. 184.
	Last segment of hind tarsi dark; mesonotal scales brown in ♀, pale yellow in ♂.	*inquinatus*, p. 169.

65. **Aëdes (Finlaya) poecilus** Theobald, 1903.

M.C. iii, p. 283 (*Finlaya poicilia*) (♀). TYPE-LOC.: Penang, Malay Penin. x. 1901 (*Freer*). TYPE: ♀ in Brit. Mus.

ADULT *.—Very distinct on account of the spotted wings and presence of numerous spots and bands on the legs. In general appearance it somewhat resembles *Aëdomyia venustipes* (Skuse). Wing about 2·5–3 mm.

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* Edwards 1924, p. 380, and 1926 *a*, p. 104.

♀.—*Head*: a few white scales in middle of vertex and two patches of white scales at each side, remainder covered with black scales; rather numerous upright scales on nape extending forwards some distance. Tori with white scales on inner sides, some black scales on first flagellar segment, antenna otherwise brown. Clypeus and palpi black, latter with white scales at apices. Proboscis black, with a clear white ring rather beyond the middle and a small white ring at base of labella. *Thorax*: mesonotum black, with a covering of greyish and white scales, some flat silvery scales laterally in front of wing-roots. Scutellar scales black on lateral lobes, black and white on mid-lobe. Integument of pleuræ black, with patches of white scales, some of these forming a more or less continuous line from mesepimeron to *apn*; some black and white scales on *ppn*. *Wings*: speckled with rather broad black and white scales, white scales usually forming two or three small spots on costa. *Legs*: black, with numerous white rings: all femora and fore and mid-tibiæ each with about six white rings and narrowly pale at tips; hind tibiæ with about four similar rings. Tarsi with three or four white rings, segment 5 also entirely pale. *Abdomen*: brownish-black, a pair of submedian white spots in middle of each tergite, laterally a white longitudinal mark on tergal borders and a white spot near hind margins; on sternites V–VII there are outstanding tufts of dark scales.

[♂ (specimen from Philippine Is. in British Museum).—Colouring much as in ♀. Palpi about as long as proboscis, dark brown, with five white rings and narrow white tip; few long hairs on last two segments. *Hypopygium*: coxite with cluster of about 8 very large but pointed scales on inner side at about mid-length; style rather short, widened beyond middle; blade of harpago very long, scarcely widened in middle, ending in a long point.]

[LARVA *.—Pale in colour, including head and siphon. *Antenna* short, shaft smooth, with a single or bifid hair beyond middle. *Frontal hairs*: *A* 5-branched; *B* 2-branched; *C* 2–3-branched, placed well behind *B*; *d* 3-branched, nearly as long as *B*. *Thorax* and *abdomen* with numerous many-branched stellate hairs, but no special spines on plates on thorax. Comb of numerous teeth in a patch. *Siphon* short and rather broad, its surface covered with minute hairs; no acus (an unusual feature in this subgenus); pecten

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* [Brug 1931 *b*, p. 23. Redescribed above from some of Brug's Javan specimens in the British Museum. The larva of the allied *A.* (*F.*) *kochi* of New Guinea and Samoa, of which *A. poecilus* was at one time regarded as a variety, differs in several respects, having clypeal hair *C* long and single, siphon without fine hairs on surface, pecten-teeth simple and needle-like.]

of only 6–10 rather large teeth, which are finely fringed all along one side and at the tip, no simple teeth at end of row and none detached; tuft of 3–5 branches just beyond middle of tube. *Anal segment* with moderately large saddle with spiny margin; *isc* with 4–5 branches; *lh* long, 2-branched; papillæ longer than segment, equal and pointed.]

HABITAT (in Java).—Leaf-axils of *Colocasia indica* and *Crinum* sp.

DISTRIBUTION.—N. BENGAL: Sureil and Tindharia, Darjeeling dist., 5,000′ (*M. O. T. Iyengar*). BURMA: Sandoway *, x. 1924 (*Civil Surgeon*).

Recorded also from MALAY PENINSULA and ARCHIPELAGO, and PHILIPPINES.

66. **Aëdes (Finlaya) gubernatoris** (Giles). 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 607 (*Culex*) (♀). TYPE-LOC.: Allahabad, Govt. House, vii (*Giles*). TYPE: ♀ in Brit. Mus.

Lepidotomyia magna Theobald, 1905, Gen. Ins., Fam. Culicidæ, p. 22 (♂ & ♀). TYPE-LOC.: Bombay, viii. 1902 (*James*). TYPE: ♂ & ♀ in Brit. Mus.

var. n. *kotiensis* (see under "Larva"). TYPE-LOC.: Koti, near Kalka, W. Himalayas.

ADULT † (Pl. I, figs. 5, 6).—A fairly large black and white species. One of the commoner tree-hole breeding mosquitoes of Western India. Wing about 4·5–5 mm.

♀.—*Head*: a median pale line on vertex, a narrow pale border to eye-margins widening out at sides, a dark patch on either side of median line. In some specimens the dark patches are faint or absent and the head then appears mainly pale. Fairly numerous yellowish upright scales on nape extending forwards some distance. Antennæ, clypeus, palpi, and proboscis black. Palpi about $\frac{1}{6}$ length of proboscis, latter about same length as fore femur. *Thorax*: a large patch of white scales on front of mesonotum, the posterior margin of which is usually deeply emarginate, as shown in Pl. I, figs. 5, 6; a large oval white patch in front of each wing-root, and usually a thin median line posteriorly, dividing either side of ante-scutellar bare space; remainder of mesonotum covered with brownish-black scales. Mid-lobe of scutellum covered with lanceolate creamy or white scales; usually very few narrow hair-like white scales on lateral lobe. Postnotum and integument of pleuræ brownish-black; *apn* and larger part of *ppn* with broad white scales; several large and small patches of flat broad white scales

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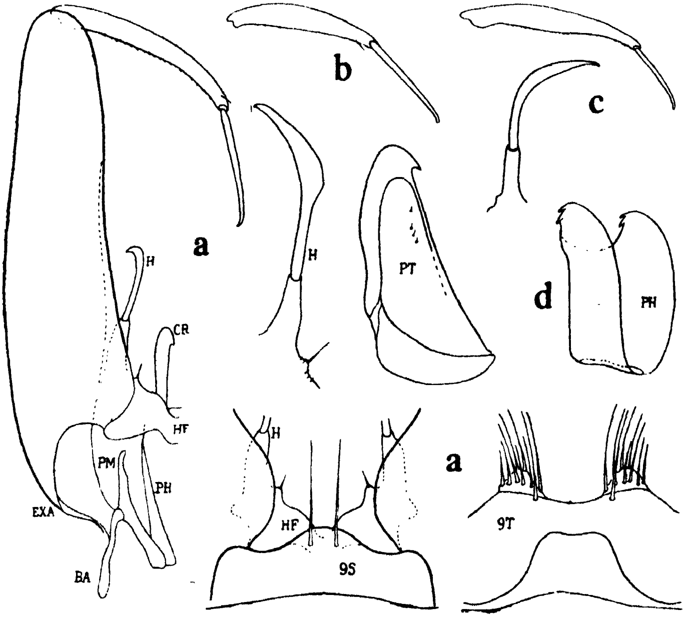
† Theobald 1901 *a*, p. 314 (*Stegomyia*), 1907, p. 223 (*Phagomyia*), and p. 250 (*L. magna*); Edwards 1913 *b*, p. 226, and 1917, p. 214 (syn.); Barraud 1923 *d*, pp. 214 and 216 (*F. magna*); 1923 *g*, pp. 482–3.

on pleuræ. *Wings*: dark scaled. *Legs*: black, with white markings; fore femur black anteriorly, white on nearly basal ½ beneath; mid-femur black, with white ventral streak on anterior surface on basal ½, and white marking at knee, posteriorly broadly pale, except dorsally, on nearly apical ½; hind femur white, except for narrow basal dark ring and wider subapical ring. Fore tibia usually very narrowly pale at base, broadly pale at tip and entirely pale for whole length beneath; mid-tibia black, with pale marking at base and larger pale marking at tip; hind tibia usually entirely black. Fore tarsi usually very narrowly pale at base of first two segments, sometimes some pale scales at apex of segment 1, this segment also pale beneath for whole length, other parts black; markings of mid-tarsi subject to some variation, basal and apical white rings on segment 1 and medial dark ring variable in size, sometimes absent, when whole segment is white, a basal white ring on segment 2, usually occupying about ½ the segment or more; there may,

Fig. 35.



♂ hypopygial structures of *Aëdes*, subgenus *Finlaya*: **a**, *gubernatoris*; **b**, *cacharanus* (style); **c**, *khazani* (style and harpago); **d**, *unicinctus* (phallosome, dorsal surface to left). Lettering as on p. 4.

or may not, be pale scaling over joint between 2 and 3; hind tarsi with rather narrow white basal and apical rings to segment 1, a basal white ring on 2, and usually some pale scales at joint between 2 and 3. *Abdomen*: black, with usually median basal yellowish or white markings, not forming complete bands; always lateral basal white patches on tergites I–VII and white basal bands on sternites; sternite VIII large, without scales, cerci short.

♂.—Palpi black, about length of proboscis, last two segments with moderately long outstanding hairs. White scaling on mesonotum usually more extensive than in ♀, and head-scaling generally lighter. *Hypopygium* (fig. 35, **a**): 9*t* with 9–10 rather long hairs on each lobe; coxite long and narrow, nearly 4 times length of greatest width; style with terminal appendage, latter more than ½ length of former; phallosome scoop-shaped. Harpago expanded in middle, blade much longer than stem; paraproct toothed at crown, with a few minute hairs below.

LARVA *, type-form (fig. 36, **a**, **e**).—Arrangement of frontal hairs shown in figure (**a**). Antennal shaft smooth, about 12 times as long as wide: antennal hair single, arising at nearly ⅔ from base. Lateral hairs of thorax well developed and strong; no large spines or special structures. Abdominal segments with fairly long 2-branched hairs. *Comb* of 30–40 scale-like teeth, each tooth rather broad at tip and ending in a number of points. *Siphon* 1½ to twice length of diameter at base. Pecten of 14–17 strong teeth, each usually with 2 denticles near base. Hair-tuft of about 6 plumose blade-like branches, somewhat resembling a palmate hair (characteristic of this and several allied species); base of hair-tuft nearer apex than base of tube, sometimes between the pectens, but usually just beyond. *Anal segment* enclosed, except ventrally, within a large chitinised saddle; *lh* short and strong, unbranched; *isc* of 8–10 rather short, subequal black branches; *osc* single and long, as usual. Fan of 10–12 strong black hairs of only moderate length, with primary and secondary branches. Both pairs of papillæ shorter than saddle, bluntly pointed.

Another form of the larva, var. n. **kotiensis**, is known. The adults resulting from these larvæ appear to be indistinguishable from the type-form. The points distinguishing these larvæ and those of *A.* (*F.*) *deccanus* and *A.* (*F.*) *assamensis*, which are very similar, are given in the summary on p. 163. The larvæ of several other closely allied species are at present unknown.

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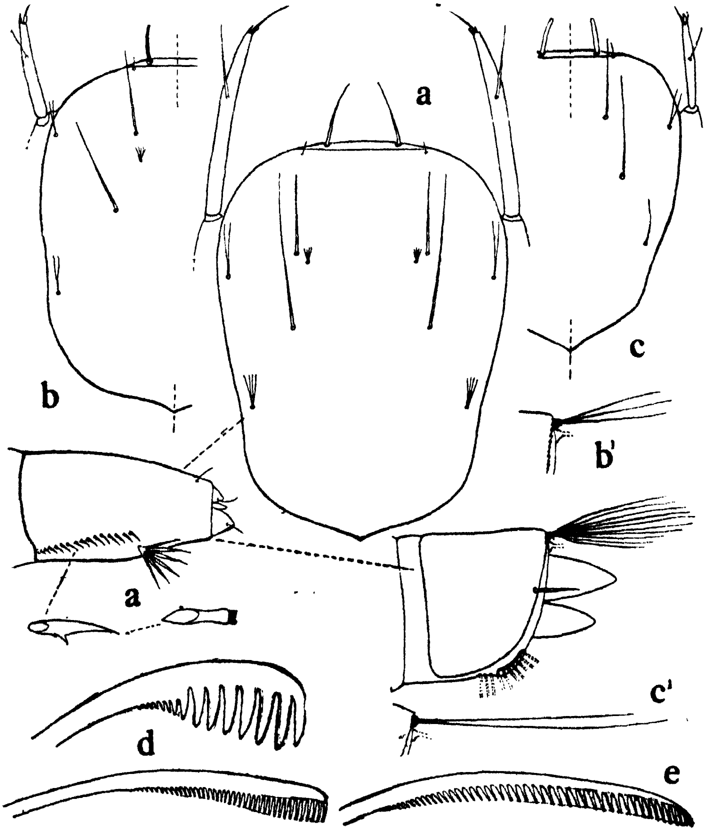
* Barraud 1923 *e*, p. 220 (*F. magna*); Senior-White 1927, p. 68.

Habitat.—Tree-holes; also rock-pools (?) *.

Distribution.—Common in United Provinces, Punjab, and Bombay Presidency.

Records from other parts require confirmation *. The species appears to be absent from Bengal, Assam, and Burma. Further work is required upon this difficult group of species.

Fig. 36.



Larval structures of *Aëdes*, subgenus *Finlaya*: **a**, *gubernatoris* (head, siphon, anal segment, enlarged pecten-tooth and comb-scale; **e**, hair of mouth-brush); **d**, *gubernatoris* var. *kotiensis*, two hairs of mouth-brush; **b**, **b**¹, *deccanus*; **c**, **c**¹, *assamensis* (head; portion of anal segment with *isc*; hair *d* omitted in **c**).

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* [A series of specimens in the British Museum from Ceylon (Suduganga, bred from rock-pools, *Senior-White*) closely resemble *A. gubernatoris* except that scales of mid-lobe of scutellum are purer white and broader. Larvæ of this form have not been preserved.]

Summary of characters distinguishing the larvæ of several species of the *gubernatoris* group :—

Preclypeal spines conspicuous, of moderate length, strong and rather blunt. Antennal shaft 0·26 mm. long. Median hairs of mouth-brushes with moderately large teeth. Frontal hair *d* posterior to *B*, and nearer to that hair than to *C* (fig. 36, **b**), usually slightly longer than in *gubernatoris*, and usually of only 3–4 branches (fig. 36, **b**^{1}). Branches of siphonal tuft as in *gubernatoris*	*deccanus.*
Preclypeal spines stout and blunt (fig. 36, **c**). Antennal shaft 0·2–0·25 mm. long. Median hairs of mouth-brushes with comparatively large teeth. Frontal hair *d* very small and nearer to *C* than to *B* ; *isc* of only 2 long branches (about 1 mm.). Branches of siphonal tuft less widened than in *gubernatoris*	*assamensis.*
Preclypeal spines, antennal shaft, and branches of siphonal tuft as in *assamensis*. Frontal hairs *B*, *d*, and *C* standing one behind the other at fairly even, wide intervals ; *isc* of 3–6 long fine branches	*feegradei.*
Preclypeal spines inconspicuous, slender, and tapering to a fine point. Antennal shaft from 0·41 to 0·51 mm. long. Median hairs of mouth-brushes with very small teeth. Frontal hair *d* slightly posterior to and near to *B*; *isc* with 6–8 branches, longest about 0·5 mm. long. Branches of siphonal tuft widened, somewhat resembling leaflets of a palmate hair (fig. 36, **a**, **e**)	*gubernatoris* (type-form).
As above, but antennal shaft shorter, from 0·32–0·35 mm. long. Median mouth-brush hairs with comparatively very large teeth (fig. 36, **d**)	*gubernatoris* var. *kotiensis.*

67. Aëdes (Finlaya) deccanus Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 317 (*Finlaya*) (♂ & ♀). TYPE-LOC. : Belgaum, Bombay, Deccan, viii. 1921 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT * (Pl. I, fig. 4).—Very similar to *assamensis* and *feegradei*, differing from the former only in the absence of obvious tufts of outstanding scales on the abdomen, and from the latter in the presence of a median white line on the vertex in ♀.

LARVA † (fig. 36, **b**).—Very similar to *gubernatoris*, but differs constantly, as indicated in the notes under the description of that larva.

HABITAT.—Tree-holes.

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* Barraud 1923 *g*, p. 483.

† Barraud 1923 *e*, p. 221.

DISTRIBUTION.—BOMBAY: Deccan, Belgaum * (as above), Tavargatti *, and Nagargali *, viii. 1921 (*Barraud*); Bombay Harbour, Trombay, and Elephanta Island *, vii. 1921 (*Barraud*). WESTERN HIMALAYAS: Koti *, near Kalka, viii. 1923 (*Barraud*).

Not recorded from outside the Indian area.

68. **Aëdes (Finlaya) feegradei,** sp. n.

TYPE-LOC.: Rangoon, Burma, 1930 (*Feegrade*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Very similar to *cogilli*, *deccanus*, and *assamensis*, differing from the first in having black scales on all scutellar lobes and *ppn* almost entirely covered with flat white scales; from *deccanus* and *assamensis* in absence of a median white line on head in ♀, rather smaller prealar white patches, and rounder white area on front of mesonotum. Wing 3·5–4 mm.

♀.—*Head*: a narrow pale border to eye-margins widening out at sides; vertex without a median pale line, entirely covered with flat black scales, dark upright scales on nape. Antennæ, clypeus, palpi, and proboscis black; palpi about ¼ length of proboscis, latter slightly longer than fore femur. *Thorax*: mesonotum with fairly large patch of silky white scales in front, posterior margin of this area convex, not emarginate; its sides continuous with a large patch of flat white scales covering *ppn*; a small area of narrow white scales in front of each wing-root and, adjoining this, a small patch of broad white scales on margin of mesonotum behind anterior spiracle; remainder of mesonotum covered with brownish-black scales, no pale scales posteriorly in front of scutellum. Scutellar scales black on all lobes and fairly broad. Postnotum and integument of pleuræ black. Broad white scales on *apn*, 2 patches on sternopleura, 1 on upper part of mesepimeron, small round spots of white scales on propleura and on coxæ of fore and mid-legs. *Wings*: dark scaled. *Legs*: fore femur black, except narrowly beneath on basal ½; mid-femur white ventrally on both surfaces on basal ½ and at knee, otherwise black; hind femur with narrow black basal ring, a wider black ring on apical ⅓, otherwise white, but actual tip of knee dark. Fore tibia black, with a few pale scales at base beneath and a subapical white marking not forming a complete ring above; mid-tibia black, with subapical dorsal white mark; hind tibia entirely black, except for yellowish appearance at tip on inner side. Fore tarsi black; mid-tarsi with rather narrow basal and apical white rings, latter continuous with basal white ring on segment 2, otherwise black, hind tarsi with small dorsal white mark at base of segment 1, a fairly broad white ring over joint between 1 and 2, otherwise black. *Abdomen*:

black, with large basal lateral silvery patches on tergites I–VII, a small silvery dorsal mark on VIII ; sternites with basal white bands, small tufts of outstanding black scales on IV–VII, VIII large, without scales ; cerci small. On tergites V–VII the black scales in mid-dorsal line project slightly.

♂.—Palpi black, slightly shorter than proboscis, with few outstanding hairs on terminal segment. In type ♂ and one other there is a median white line on vertex flanked by dark patches, a pale border to eye-margins, widening out considerably at sides. White area on mesonotum larger than in ♀ and continued posteriorly in three faint lines to scutellum. Scales on scutellum black as in ♀, and other ornamentation similar.

LARVA.—Very similar to *assamensis*, but frontal hairs *B*, *d*, and *C* standing one behind the other at fairly even, wide intervals, and *isc* of 3–6 long, fine branches. Siphonal tuft divided into 7–8 strong barbed branches, less widened than in *gubernatoris* and *deccanus*.

HABITAT.—Tree-holes.

DISTRIBUTION.—Known only from type-locality.

69. **Aëdes (Finalya) cogilli** Edwards, 1922.

Bull. Ent. Res. xiii, p. 92 (♀). TYPE-LOC : Karwar, N. Kanara, ix.–x. 1902 (*Cogill*) (♀) ; Karwar, ix. 1921 (*Barraud*) (♂). TYPE : 2 co-type ♀♀ and allotype ♂ in Brit. Mus.

ADULT ♀ † (Pl. II, fig. 3).—A medium-sized black and white species resembling *gubernatoris*, but differing as follows :—*Head* without a median white line ; eye-margins with narrow border of white scales ; *ppn* bare, except for a small patch of flat white scales on lower posterior margin. White patch on front of *mesonotum* somewhat large, rounder, and more silky ; prealar white patches smaller. Scutellum with mid-lobe densely covered with flat white scales, flat black scales on lateral lobes. *Leg* markings very similar to those of *deccanus*, but scaling of head and scutellum different.

♂.—Dorsum of head covered with flat dark scales, a narrow border of white scales to eye-margins widening out at sides ; palpi distinctly shorter than proboscis, terminal segments with few hairs. *Hypopygium* : coxite with small round lobe at base of dorsal border, bearing a collection of long hairs. Blade of harpago tapering, and hardly expanded in middle.

LARVA.—Unknown.

HABITAT.—Tree-holes and hollow bamboos.

DISTRIBUTION.—Karwar * (as above). BOMBAY DECCAN : Nagargali *, viii. 1921 (*Barraud*).

Not known from elsewhere.

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† Barraud 1923, p. 484.

70. **Aëdes (Finlaya) assamensis** (Theobald), 1908.

Rec. Ind. Mus. ii, p. 290 (*Stegomyia*) (♀). TYPE-LOC.: Assam, Sylhet, iv. 1905 (*Hall*). TYPE: ♀ in Ind. Mus.

ADULT * (Pl. I, figs. 11, 12, and Pl. II, fig. 1).—Very similar to *deccanus* and *feegradei* in the ♀, and to *gubernatoris* in ♂, but differs from these as indicated in key. It is rather smaller than the three referred to. *Hypopygium*: does not show any very marked differences from allied species.

LARVA † (fig. 36, **c**).—Very similar to *deccanus* and *gubernatoris*, but differs from both in arrangement of frontal hairs, form of preclypeal spines, and length of antenna, also in having *isc* with but 2 branches, which are more than twice length of segment (compare fig. 36, **a** & **c**, and *vide* remarks under larva of *A.* (*F.*) *gubernatoris*).

HABITAT.—Tree-holes.

DISTRIBUTION.—Common in ASSAM and in NORTH and EAST BENGAL. It almost certainly occurs in Burma, but there are no records.

Known also from COCHIN CHINA (*Borel*) and JAVA (*R. W. Paine*, 1931; ♂ & ♀ in Brit. Mus.).

71. **Aëdes (Finlaya) cacharanus** Barraud, 1923.

Bull. Ent. Res. xiii, p. 406 (*Finlaya*) (♂ & ♀). TYPE-LOC.: Haflong, Cachar Hills, Assam, vii. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡ (Pl. I, figs. 7, 8).—Very similar to *cogilli*, *feegradei*, and other black and white species of the subgenus, but may be distinguished on the following combination of characters:—*Head* with a narrow median white line. White patch on front of mesonotum round as in *cogilli*. Prealar white patches fairly large, a small patch of flat white scales on posterior margin of *ppn*; all femora with small white knee-spots; fore tibiæ entirely pale beneath for whole length, except at extreme tip, all tibiæ with a white mark dorsally near tip; fore tarsi dark, or with a few pale scales at base of segments 1 and 2; mid-tarsi with basal white ring to segment 1, and a fairly broad apical white ring continued on to segment 2 as basal white ring; similar rings on hind tarsi, and some pale scales at joint between segments 2 and 3.

♂.—Palpi about length of proboscis, terminal segments with moderate hair-tufts. Mesonotum almost entirely covered with white scales. Upper surface of head mainly white. Other markings as in ♀. *Hypopygium*: style (fig. 35, **b**) with very long terminal appendage, ⅔–¾ length of style. Other structures very similar to allied species.

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* Barraud 1923 *b*, p. 408, and 1923 *g*, p. 486; Borel 1928 *b*, p. 54.

† Barraud 1923 *e*, p. 222; Borel 1928 *b*, p. 56.

‡ Barraud 1923 *g*, p. 485.

LARVA.—Unknown.

HABITAT.—Tree-holes.

DISTRIBUTION.—ASSAM : Haflong * (as above) ; Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*). N. BENGAL : Meenglas, Jalpaiguri, vii. 1922 (*M. O. T. Iyengar*).

Not recorded from elsewhere.

72. **Aëdes (Finlaya) lophoventralis** (Theobald), 1910.

Rec. Ind. Mus. iv, p. 13 (*Pseudocarrollia*) (♀). TYPE-LOC. : Purnea, Bihar (formerly Bengal), viii. 1907 (*C. Paiva*). TYPE : ♀ in Ind. Mus.

ADULT † (Pl. II, fig. 5).—A rather large and ornate black and white species. Wing 3·5–4 mm.

♀.—*Head*: a narrow white border to eye-margins ; remainder covered with black flat scales and numerous dark upright scales extending from nape on to vertex. Eyes touching in front. Tori, clypeus, palpi, and proboscis black, flagellum of antenna dark brown. *Thorax*: a large round patch of silky white scales covering anterior part of mesonotum, a small white area in front of each wing-root, otherwise scales are brownish-black. Flat white scales on scutellar lobes. A line of broad silvery scales on *apn* and a small patch on lower part of *ppn* ; three small and two larger patches of silvery scales on pleuræ. *Wings*: dark scaled. *Legs*: black, with white markings. Fore femur dark above, pale at base beneath ; mid-femur with a white ventral streak on anterior surface on basal ½ and white mark at knee, narrowly pale posteriorly at base ; hind femur with narrow basal and much wider subapical black rings, otherwise white. Tibiæ entirely dark except for white dorsal mark at tip on all legs. All tarsi with pale scaling or a pale ring at base of segment 1, and a pale ring over joint between 1 and 2 ; on mid-leg this ring is sometimes very wide, including the whole of 2, and extending on to 3, or the middle of segment 2 may be dark, with another white ring over joint between 2 and 3. *Abdomen*: black; tergites with lateral basal or medial silvery markings not usually produced on to dorsum ; sternites III–V with basal white bands, outstanding tufts of black scales on sternites V–VII only (this seems to be characteristic of the species.)

♂.—Palpi black, a little shorter than proboscis, last two segments turned downwards and with small tufts of black

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† Theobald 1910 *b*, p. 186 (*Pseudocarrollia*) ; Edwards 1917, p. 214 (*Ochlerotatus*) ; Barraud 1923 *g*, p. 487.

hairs. Antennæ strongly plumose. First two segments of mid-tarsi usually mainly white. Scale-tufts on sternites as in ♀. *Hypopygium*: coxite shorter and more rounded at apex than in *gubernatoris*, otherwise very similar to that species.

LARVA.—No specimens available for description.

HABITAT.—Tree-holes; sometimes water-butts.

DISTRIBUTION.—Common in NORTH BIHAR from March to October, and known also from EASTERN BENGAL (Chittagong, vii. 1922 (*Barraud*)), but not recorded from elsewhere.

73. **Aëdes (Finlaya) khazani** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 265 (♂ & ♀). TYPE-LOC.: Pudupadi, Malabar Coast, xi. 1915 (*Khazan Chand*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT * (Pl. I, figs. 9, 10, and Pl. II, fig. 2).—A black and white species of moderate size; recognized by very long projecting scales on venter, as shown in Pl. II, fig. 2, and by absence of scales from *ppn.* The only other known Indian species which has very similar long projecting scales on venter is *A.* (*F.*) *prominens*, but in this there is a patch of white scales on *ppn.* The following characters are present in *khazani*:—Scutellar scales in ♀ flat and dark brown, in ♂ white, on all lobes. Hind tarsi with a wide white ring over joint between segments 1 and 2. ♂ *hypopygium*: see fig. 35, **c**.

LARVA (one damaged skin available).—*Frontal hair A* quite small, with 4–5 fine branches; *B* single and placed some distance anterior to *A*; *C* slightly posterior to level of *A*, and almost in line behind *B*, actual hair missing; *d* anterior and slightly internal to *C*, with 4–5 small fine branches; *e* with 2–3 fairly long fine branches. Antennal shaft smooth, with single hair very near tip, shaft about 10 times length of width at base. Mouth-brush hairs simple. Lateral hairs of *thorax* well developed. No large spines, but some small hairs with 6–8 branches. *Abdomen*: I and II with fairly long 4–5-branched hairs, following segments with moderately long 2-branched hairs. Comb of fairly numerous teeth, each ending in a number of fine points. *Siphon* brown, with black ring at base, length about 1 mm.; pecten of 15 fairly short strong teeth, each with one large lateral denticle and one or two smaller; tuft missing, its base close to most distal pecten-tooth. *Anal segment* enclosed, except ventrally, within a chitinised saddle with some short strong spines on posterior border towards dorsum; *isc* of about 8 fairly long, subequal branches, a little more than twice length of saddle; *lh* of 3 fine branches. Fan moderately developed, about 10 hairs arising from plate, each split into a number of branches. Papillæ apparently shorter than saddle, ends bluntly pointed.

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* Barraud 1923 *g*, p. 488; Borel 1928 *b*, p. 57.

HABITAT.—Tree-holes.

DISTRIBUTION.—MALABAR COAST * (as above). NORTH KANARA: Karwar *, ix. 1921 (*Barraud*). EASTERN BENGAL: Rangamatti * (Chittagong Hill Tracts), ix. 1922 (*Barraud*). NORTH BENGAL: Sukna *, Darjeeling dist., x. 1922 (*Barraud*).

Recorded also from COCHIN CHINA (*Borel*).

74. **Aëdes (Finlaya) prominens** Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 228 (*Finlaya*) (♂ & ♀). TYPE-LOC.: Sukna, Darjeeling dist., ix. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀ †.—Very similar to *khazani*, having tufts of very long outstanding scales on venter of abdomen and roughened scales on dorsum, but differs in having a patch of white scales on *ppn* and some white scales on lateral lobes of scutellum. On hind leg there is white scaling over tibio-tarsal joint, over joint between tarsal segments 1 and 2 (usually narrower than in *khazani*), and at base of 3.

♂.—*Hypopygium*: appendage of style rather more than ½ length of latter; blade of harpago much more expanded in middle than in *khazani*.

LARVA.—Has not been isolated in India, but has been described and figured by Borel (1928 *b*, p. 59). It is apparently very similar to that of *assamensis*, but the pecten-teeth, of which there are 12–18, are rather shorter. Siphon rather less than twice length of diameter at base. Comb of about 45 teeth. Arrangement and character of the clypeal hairs not stated.

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION.—NORTH BENGAL: Sukna * (as above), Tindharia *, Darjeeling dist., ix. 1922 (*Barraud*). ASSAM: Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*).

Recorded also from COCHIN CHINA (*Borel*).

75. **Aëdes (Finlaya) inquinatus** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 267 (♂ & ♀). TYPE-LOC.: Simla, viii. 1915 (*Christophers*). TYPE: ♂ and allotype ♀ in Brit. Mus.

ADULT ‡ (Pl. II, fig. 4).—Similar to species of *gubernatoris* group, but mesonotum mainly ochreous-scaled. Wing about 4·5 mm.

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† Barraud 1923 *g*, p. 489; Borel 1928, p. 57.

‡ Barraud 1923 *g*, p. 490.

♀.—*Head*: dorsal surface mainly covered with flat yellowish scales, an indistinct darker patch on either side towards the front; flat white scales laterally and upright scales on nape. Antenna, clypeus, palpi, and proboscis dark brown. *Thorax*: mesonotum in front covered entirely with ochreous scales, posteriorly with dark brown scales, the latter, in some specimens, continued forwards as a pair of submedian broad lines to front margin; a patch of pure white scales in front of each wing-base. In one specimen the dark brown scales are more numerous, the ochreous scales being reduced to patches on front margin, a median line, and lateral curved lines over each wing-root. Fairly broad brown and yellow scales on mid-lobe of scutellum, narrower yellowish scales on lateral lobes. Broad white scales on *apn* and on larger part of *ppn*. Patches of broad, flat white scales on pleuræ. *Wings*: dark scaled. *Legs*: fore femur dark anteriorly, mid-femur with a pale streak ventrally on anterior surface for rather more than basal ½ and a pale marking near knee, both pairs pale on posterior surface on basal ½; hind femur with a narrow dark ring near base and a wider subapical ring, remainder white. Fore tibia dark brown, faintly paler at apex, very small marking at base of segments 1 and 2 of fore tarsi; mid and hind tibiæ dark brown, with pale spot near apex, a pale basal band to tarsal segment 1 and a pale ring over joint between 1 and 2; on hind leg there may be some pale scaling at joint between 2 and 3. *Abdomen*: dorsum brownish-black, lateral basal white patches to tergites. Sternites broadly white basally, with black apical bands.

♂.—Scales on dorsum of head flat and nearly all pale yellow. Palpi and proboscis brownish-black, the former about ¾ length of latter. Mesonotal scales as in ♀, but ochreous or pale scales predominating. *Hypopygium*: very similar to that of *A.* (*F.*) *gubernatoris*, but blade of harpago only slightly expanded in middle.

LARVA.—Unknown.

HABITAT.—Tree-holes.

DISTRIBUTION.—WESTERN HIMALAYAS: Simla * (as above). NILGIRI HILLS *, x. 1915 (*Khazan Chand*).

Not known from elsewhere.

76. Aëdes (Finlaya) unicinctus Edwards, 1922.

Ind. Journ. Med. Res. x, p. 266 (♂). TYPE-LOC.: Simla, viii. 1915 (*Christophers*). TYPE: ♂ in Brit. Mus.

ADULT † (Pl. I, figs. 13, 14).—Distinguished by the single white ring on hind tarsi, dark proboscis, and ornamentation of mesonotum. Wing about 4 mm.

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† Barraud 1923 *g*, p. 490.

♀.—*Head*: dorsal surface dark except for a median pale line on vertex and pale margin to eyes, some pale upright scales on nape. Antenna, clypeus, and proboscis black; palpi about ¼ length of proboscis. *Thorax*: mesonotum black, marked with pale yellowish scales (Pl. II, fig. 4). Scutellar scales mostly narrow and yellowish, some dark ones on mid-lobe. Broad white scales in irregular patches on pleuræ, a large patch on *ppn*, and a line on *apn*. *Wings*: dark scaled. *Legs*: black, with white markings; fore femur white on posterior surface on basal ½; mid-femur narrowly pale on anterior surface, ventrally, on basal ½, a pale streak for whole length behind; hind femur white, except for narrow basal dark ring and much wider preapical dark ring. Tibiæ black except for white dorsal mark at tip on fore leg. Tarsi black, except for basal white ring to first segment on mid and hind legs. *Abdomen*: dorsum usually black, with small lateral basal white patches; sternites with narrow basal pale bands.

♂.—Palpi a little shorter than proboscis, fairly slender, black, with few outstanding hairs on terminal segments. Head mainly covered with flat dull white scales. Mesonotum uniformly covered with pale ochreous scales, sometimes an indistinct darker area on either side towards front. Abdomen usually marked with narrow pale basal bands on dorsum. All tibiæ with small apical white mark in some specimens. *Hypopygium* (fig. 35, **d**): coxite with small lobe at base of dorsal border bearing a dense collection of long bristles which project at right-angles to coxite. Style rather short, with terminal appendage about ⅔ length of style; blade of harpago expanded in middle, much longer than stem. Phallosome more strongly chitinised than usual, not divided into lateral plates, but with several teeth, or serrations, at apex on each side.

LARVA * (fig. 38, **b**).—*Frontal hair A* of 2 rather short branches; *B* single, at about level of base of antenna; *d* very small, close to *B*, with several fine branches, *C* posterior to *A* and *B*, single and fairly long; *e* single. Preclypeal spines unusually stout. Median hairs of mouth-brushes with fairly large teeth. *Antenna* rather short, about 10 times length of greatest width, shaft smooth, a single hair further from base than apex. Lateral hairs of *thorax* and *abdomen* moderately developed, no stellate hairs or special structures on dorsum. Comb of about 30 scale-like fringed teeth in a triangular patch. *Siphon* dark brown, lighter on about apical ⅙, as in *A.* (*F.*) *oreophilus*, about 2½–3 times length of diameter at base. Pecten of 10–12 unusually broad, short

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* Barraud 1923 *h*, p. 499.

teeth ; hair-tuft of usually 4 branches, the base at about middle of tube. Chitinised saddle of *anal segment* enclosing rather more than ½ the segment in side view, with strong spines on posterior margin ; *lh* single and fine ; *isc* 3-branched. Fan fairly well developed, each hair split into 2–3 branches. In addition to hairs attached to fan-plate, there are several small hairs arising from membrane towards base of segment. Papillæ a little longer than segment, ends pointed.

HABITAT.—Tree-holes.

DISTRIBUTION.—W. HIMALAYAS : Simla *, viii. 1915 (*Christophers*) ; Krol Mt. *, near Solan (Kalka-Simla road), ix. 1924 (*Barraud*). E. HIMALAYAS : Kurseong *, ix. 1922 (*Barraud*). Not recorded from elsewhere.

77. **Aëdes (Finlaya) albocinctus** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1002 (♂ & ♀). TYPE-LOC. : Solan, Western Himalayas (Kalka-Simla road), 4,000′, viii. 1923 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—Rather small species, with mesonotum largely white scaled and three hind tarsal segments basally banded. Wing about 3 mm.

♀.—*Head* : dorsal surface covered with flat creamy scales, a darker area on either side of middle towards front, some pale upright scales on nape. Antennæ, palpi, clypeus, and proboscis dark brown or black ; palpi about ¼ length of proboscis, latter about length of fore femur. *Thorax* : mesonotum mainly covered with a large undivided area of narrow white scales, continued back from the front, where they have a faint yellow tint, nearly to level of wing-roots, and extending posteriorly in faint lines to scutellum, the space between these lines dark brownish-black. Scutellar scales pale and narrow on all lobes. Some rather broad pale scales on *apn*, narrower yellowish scales on *ppn*. Pleuræ with irregular patches of broad white scales. *Wings* : dark scaled. *Legs* : all femora pale at base ; fore femur dark anteriorly, broadly pale from base posteriorly ; mid-femur dark, with a narrow pale area ventrally on more than basal ½ on anterior surface, more extensively pale posteriorly ; hind femur pale on both surfaces for more than basal ½, no knee-spots. Tibiæ and tarsi brownish-black, former narrowly pale at base ; narrow basal pale ring to segments 1 and 2 of fore and mid-legs, and to first three segments of hind legs. *Abdomen* : dorsum almost black, with very narrow pale basal bands, widening out at sides (in many specimens dorsum appears entirely dark, owing to slight shrinkage) ; tergite VIII and sternite VII pale.

♂.—Palpi very slightly shorter than proboscis, thin and black, terminal segments hardly perceptibly thickened, turned downwards and bearing sparse hair-tufts. Other markings as in ♀, but fore and mid-tibiæ more or less striped with pale scaling for whole length posteriorly. Distinguished from ♂ of *gilli* by absence of pale scales at base of apical segment of palpi, and by more extensive white area on hind femur, rather more than basal $\frac{3}{5}$ being pale. *Hypopygium*: does not show any marked modifications.

LARVA (fig. 38, **a**).—This has several unusual characters, notably in the development of the frontal hairs and in the form of the pecten-teeth, the latter resembling those of *Uranotænia* larvæ. *Frontal hairs A*, *B*, *C*, and *d* all well developed and all about same size, with 9 or 10 rather long subplumose branches: hair *e* long, with few lateral branches. Preclypeal spines fairly long and stout. *Antennæ* long and curved, about 0·5 mm. long, a few small appressed spinelets on shaft, hair-tuft of 3–5 branches attached at about $\frac{5}{8}$ from base on outer side. Lateral hairs of *thorax* long and divided into 6–8 subplumose branches, arising from chitinised tubercles: several pairs of stellate hairs on dorsum with long fine branches. Lateral hairs of first two *abdominal* segments 4-branched, those of following segments 2-branched: stellate hairs on dorsum similar to thorax. Comb of about 30 long, pointed, fringed teeth in a patch. *Siphon* dark brown, almost straight-sided, slightly tapering, from 3–4 times length of diameter at base; acus small: pecten of about 20 close-set scale-like teeth fringed on both sides, usually 6–8 smaller and more pointed teeth irregularly arranged at base; tuft of 4–10 finely subplumose branches arising at about middle of tube and slightly beyond most distal pecten-tooth. *Anal segment* with a dark brown chitinised saddle covering rather more than dorsal $\frac{1}{2}$; both saddle and membranous part of segment covered with minute spines set in small groups; *lh* of 4–5 moderately long branches with lateral fraying. Fan of about 12 hairs arising from fan-plate, each hair dividing some distance from base into about 6 branches. Dorsal papillæ about length of segment, ventral pair shorter; *isc* of 3–5 branches, two of which are very long.

HABITAT.—Tree-holes.

DISTRIBUTION.—W. HIMALAYAS: Solan * and Koti * (Kalka-Simla road), 2–4,000′, viii. 1923 and vi. 1930 (*Barraud*); Kakar Hatti *, near Sabathu, viii. 1924 (*Barraud*).

Not recorded from elsewhere.

78. **Aëdes (Finlaya) stevensoni** Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 219 (♂ & ♀). TYPE-LOC.: Bombay Deccan, Nagargali, viii. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Ornamentation shown in photographs (Pl. III, fig. 15, ♀, and Pl. IV, fig. 1, ♂). Differs from *albotæniatus* and other black and white species in having a distinct pale band on proboscis, three rather *small* white spots or patches on mesonotum, and basal white bands on first *three* segments of hind tarsi. All the known specimens have the scutellum somewhat denuded, but the scales remaining appear to be black in ♀ and partly white in ♂.

♂.—*Hypopygium* (fig. 37, **a**): style comparatively short, with long terminal appendage; harpago with broad leaf-like blade.

LARVA.—Unknown.

HABITAT.—Bamboos.

DISTRIBUTION.—NORTH KANARA: Kadra *, ix. 1921 (*Barraud*), and type-locality * as above.

Not known from elsewhere.

79. **Aëdes (Finlaya) albotæniatus** (Leicester in Theobald), 1904.

Entom. xxxvii, p. 111 (♂ & ♀) (*Danielsia*). TYPE-LOC.: Kuala Lumpur, Malay Penin., from bamboos (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Finlaya lepchana Barraud, 1923, Ind. Journ. Med. Res. xi, p. 217 (♂). TYPE LOC.: Tindharia, Darjeeling dist., x. 1922 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT ♂ ‡.—Ornamentation shown in photographs (Pl. I, fig. 15, and Pl. II, fig. 6). *Palpi* and proboscis about same length, latter entirely dark brown, former with or without an ill-defined white ring in middle § and with hair-tufts on terminal segments. *Wings*: dark scaled, except for a short white line on anterior edge of costa at base. *Legs*: fore femur dark above, lined with pale scaling beneath for whole length, mid-femur dark anteriorly, with a pale ventral line on basal ½, pale posteriorly, except for a dark ring near base and a dorsal dark streak; hind femur dark along dorsal edge, a dark ring near base and a subapical dark ring, otherwise white. Tibiæ dark brown, pale at bases and more narrowly at tips, fore and mid-pair pale beneath for whole length. Tarsi dark brown, with narrow white markings or rings

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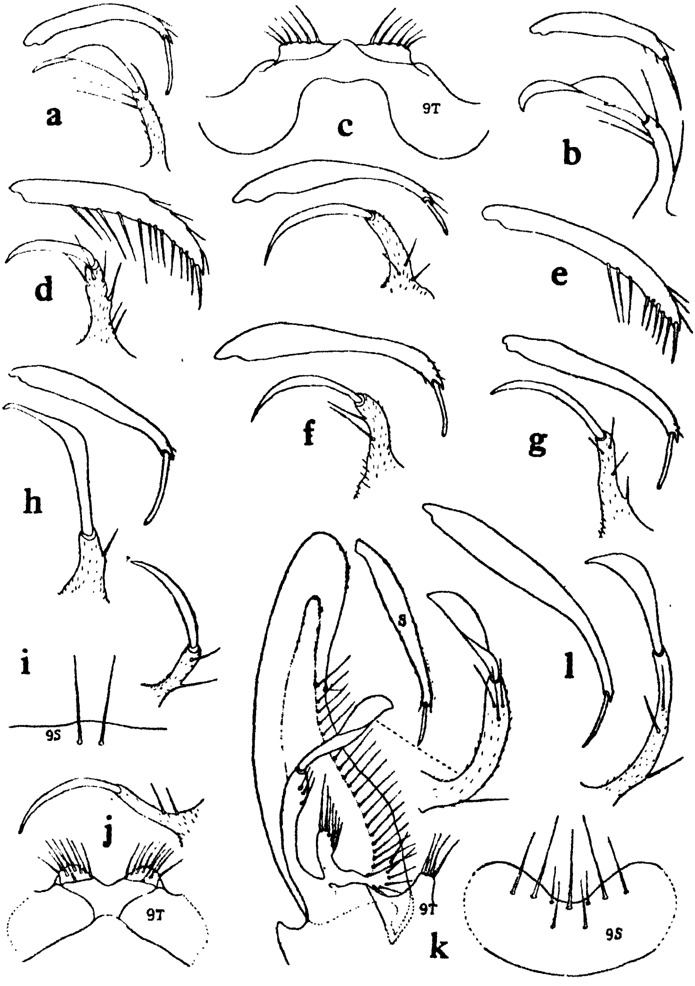
† Barraud 1924 *a*, p. 849.

‡ Leicester 1908, p. 117; Barraud 1923 *g*, p. 491.

§ [Indicated in type ♂ of *lepchana*, but absent in some Indian specimens and absent in type ♂ of *albotæniatus*.]

at base of first two segments on fore and mid-legs; wider white rings at bases of first four segments on hind leg, and a few white scales at tip of segment 1. *Hypopygium*: coxite with long scales and bristles on the internal (ventral) border; dorsal border with a collection of very long scales

Fig. 37.



hypopygial details (style, harpago, etc.) of *Aëdes*, subgenus *Finlaya*: **a**, *stevensoni*; **b**, *albotæniatus*; **c**, *pseudotæniatus*; **d**, *elsiæ*; **e**, *shortti*; **f**, *saxicola*; **g**, *chrysolineatus*; **h**, *oreophilus* **i**, *formosensis*; **j**, *harveyi*; **k**, *greeni*; **l**, *christophersi*. Lettering as on p. 4.

or flattened hairs near base. Harpago with leaf-like blade (fig. 37, **b**).

♀ †.—Ornamentation in Malayan specimens much as in ♂ (with large white patch on middle of mesonotum on anterior ½), but proboscis with a distinct white ring in middle. On tergites VI–VII there are ˥-shaped basal lateral white marks.

[LARVA.—Not isolated in India. A drawing made by Mr. A. J. E. Terzi in 1915 from a specimen obtained at Ginting Simpah, F.M.S., by Dr. A. T. Stanton shows the following features :—*Comb* of about 14 slender sharp-pointed teeth in a patch ; uppermost and lowermost tufts of VIII remarkably large, each with about 15 branches, median tuft of only about 5 branches. Siphon very long for an *Aëdes,* fully 6 times as long as its diameter at base, tapered on distal ⅓ only ; pecten of only about 10 almost simple teeth, with one widely detached from the rest ; tuft 4-branched, well beyond the detached pecten-tooth ; *osc* 4-branched ; *lh* long and single. No drawing was made of the head, and the specimen appears to be lost.]

HABITAT.—Bamboos.

DISTRIBUTION.—BENGAL : Tindharia * (as above), Sukna *, Darjeeling dist., viii. 1928 (*Sobha Ram*). ASSAM : Nongpoh *, Khasi Hills dist., viii. 1922 and iii. 1927 (*Barraud*).

Known also from MALAY PENINSULA and DUTCH EAST INDIES.

[var. **mikiranus** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 269 (*A.* (*F.*) *mikiranus*) (♀). TYPE-LOC. : Mikir Hills, Sibsagar dist., Assam, i. 1911 (*Christophers*). TYPE : ♀ in Brit. Mus.

ADULT ♀ ‡.—(Pl. I, fig. 16, and Pl. IV, fig. 5).—Closely resembles *albotæniatus* ♀ in all respects except that the mesonotum is brown above, lacking the large anterior median white patch. As typical ♂♂ of *albotæniatus* have been found in the same localities with these ♀♀ it is almost certain that *mikiranus* is merely a local variety of *albotæniatus.*

LARVA.—Unknown.

HABITAT.—Bamboos.]

DISTRIBUTION.—ASSAM : Mikir Hills * (type-locality) ; Nongpoh *, Khasi Hills dist., xi. 1921 (*Christophers*), and vii. 1922 (*Barraud*) ; Haflong *, Cachar Hills, viii. 1922 (*Barraud*). BENGAL : Tindharia *, Darjeeling dist., ix. 1922 (*Barraud*).

Not recorded from elsewhere.

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† See below, under var. *mikiranus.*

‡ Barraud 1923 *g*, p. 491.

80. **Aëdes (Finlaya) macdougalli Edwards, 1922.**

Ind. Journ. Med. Res. x, p. 271 (♂ & ♀). TYPE-LOC.: Diyatalawa, Ceylon, iii. 1910 (*MacDougall*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT * (Pl. III, fig. 14).—Resembles *A.* (*F.*) *elsiæ* and *pseudotæniatus*, but differs from both as indicated in key. Wing about 4 mm.

♀.—*Head*: a median line of golden scales from nape to front of vertex and a narrow pale border to eyes; a dark area on either side of middle line towards front; numerous dark upright scales on nape; alternate patches of yellowish and dark flat scales at sides. Antenna and clypeus dark brown, palpi brownish-black, with pale scales in middle and at apices. Proboscis dark at base, mainly pale on about $\frac{2}{3}$ of length both below and above, but usually scattered dark scales along upper surface, apical $\frac{1}{3}$ dark brown. *Thorax*: mesonotum brownish-black, marked with narrow lines of golden scales as shown in Pl. III, fig. 14. Scutellar scales all narrow and golden. Narrow golden scales along upper and posterior margins of *ppn*; patches of broad pale scales on sternopleura and mesepimeron; some smaller pale scales on postspiracular area. *Wings*: a short pale line on outer side of costa at base, otherwise scales are dark. *Legs*: dark brown, with longitudinal lines of yellow scaling on both surfaces for whole length. Fore and mid-tibiæ similar, but lines not always well marked anteriorly, hind pair with pale line beneath at base only. Basal and apical pale rings over tibio-tarsal joint, over first one or two joints between tarsi on fore and mid-legs, and over first three on hind legs; all fairly narrow and about same width. *Abdomen*: dorsum black, with silvery basal bands, sternites yellowish, with white basal bands.

♂.—Palpi about length of proboscis, dark brown, with a pale ring on long segment and white scaling at base of terminal segment, last two segments with hair-tufts. Proboscis dark brown, with a rather wide pale ring in middle. Other markings as in ♀. *Hypopygium*: style less swollen at base than in *A.* (*F.*) *pseudotæniatus* and more evenly tapering.

LARVA †.—Very similar to *pseudotæniatus*, differing chiefly in presence of some stellate hairs on abdominal segments. Comb-teeth usually more numerous (50–60), some comparatively short and broad, ending in a number of points. Spines towards dorsum of anal segment strong and with several lateral points (not usually the case in *pseudotæniatus*).

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* Barraud 1924, p. 858. † Senior-White 1927, p. 68.

HABITAT.—Bamboos and rock-pools (*Brug*); filthy rock-pool in ravine (*Senior-White*).

DISTRIBUTION.—S. INDIA: Nilgiri Hills *, Coonoor (*Patton*). CEYLON: type-locality, as above, and Suduganga *, Matale dist., ix. 1919 (*Senior-White*).

Recorded from SUMATRA (*Brug*).

81. **Aëdes (Finlaya) pseudotæniatus** (Giles), 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 607 (*Culex*) (♂ & ♀). TYPE-LOC.: Naini Tal, U.P., 7,000′ (*Giles*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT † (Pl. III, fig. 10, and Pl. V, fig. 4).—Recognized by ornamentation of mesonotum, combined with the mainly dark proboscis, striped femora, and apical and basal white rings on hind tarsi.

♀.—*Head*: a median pale line from nape to front of vertex, a large dark patch on each side, a pale border to eyes, numerous dark upright scales on nape extending forwards some distance. Antennæ, clypeus, and proboscis dark brown or black, the last sometimes with some pale scaling on upper surface on basal ¼; palpi about ¼ length of proboscis, dark, with pale scaling at base and apex. *Thorax*: pale lines white or creamy, ground-colour black. Scutellar scales lanceolate, mainly pale, but a few dark. A line of pale lanceolate scales on *apn*, irregular patches of broad white scales on pleuræ, scales on *ppn* black, except for a line of pale ones along upper margin and a patch on lower posterior margin. *Wings*: a short line of white scales on outer margin of costa near base, otherwise dark. *Legs*: dark brown or black, femora and tibiæ of fore and mid-legs with narrow longitudinal lines of pale scaling for whole length on both sides; hind femur similarly marked, but tibia with pale line only on about basal ½. Pale rings over tibio-tarsal joints and over joints between tarsal segments 1–2, sometimes 2–3, and occasionally 3–4, on fore and mid-legs; similar but wider rings over joints on hind tarsi except 4–5, apical ½ of 4 and whole of 5 being dark, though 5 may appear light in certain positions. *Abdomen*: dorsum black, with narrow basal pale bands on II–VII, sternites dark, with faint apical yellowish markings in some specimens.

♂.—Palpi slightly shorter than proboscis, last two segments turned downwards and bearing small hair-tufts, white scaling at base of last segment and less distinct pale markings in

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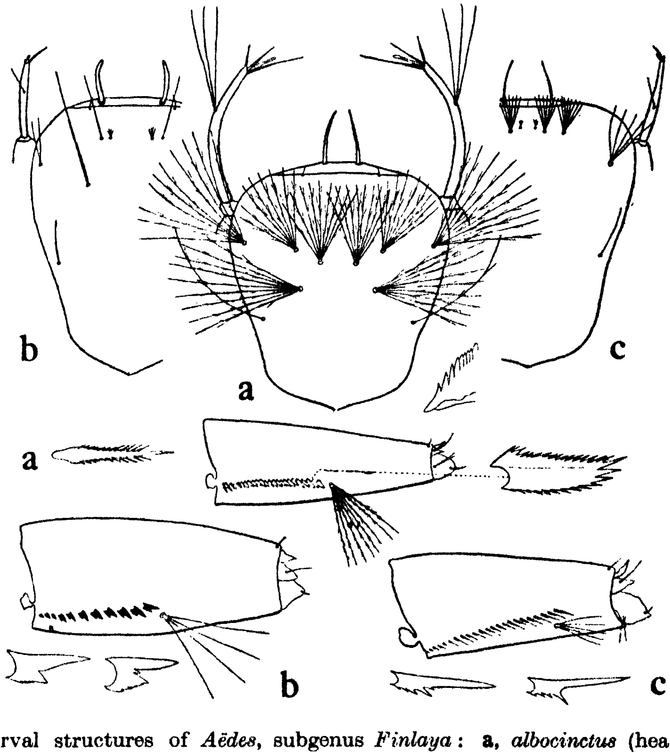
† Theobald 1901 *a*, p. 312 (*Stegomyia*); 1907, p. 222 (*Hulecœteomyia*); Barraud 1924 *a*, p. 859. This is most probably the species referred to by some earlier writers as *notoscriptus* Skuse, an Australian species not occurring in India.

middle of long segment, base of penultimate, and tip of last. Other markings as in ♀. *Hypopygium* (fig. 37, **c**): blade of harpago curved and longer than stem ; style of moderate length, with a shorter appendage than in most allied species.

LARVA * (fig. 38, **c**).—*Frontal hairs B, C, d* placed well forward, anterior to level of bases of antennæ and almost in transverse line near middle of clypeus ; *A* of 5 moderately long branches, *B* and *C* of 7–9 short branches, *d* very small, 4–5 branched, *e* usually single and fairly long. Preclypeal spines slender. *Antenna* with smooth shaft and a single hair at about middle, shaft about 10 times length of greatest width. Median hairs of mouth-brushes with small teeth. Lateral hairs of *thorax* and *abdomen* well developed. No stellate

Fig. 38.



Larval structures of *Aëdes*, subgenus *Finlaya* : **a**, *albocinctus* (head, half mentum, comb-tooth, siphon, pecten-tooth) ; **b**, *unicinctus* (head and siphon) ; **c**, *pseudotæniatus* (head and siphon).

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* Barraud 1923 *h*, p. 502 ; Senior-White 1927, p. 68.

hairs or special structures on dorsum. Comb of 40–45 rather small fringed teeth in a triangular patch. *Siphon* 2–3 times length of diameter at base; acus fairly large; pecten extending along basal ⅔ or more, of 21–28 long pointed teeth, all with lateral basal denticles; tuft of 4–6 branches, at ⅔ from base, and usually between the pectens. Dorsal saddle of *anal segment* covering about ½ segment in side view; *lh* single and long; *isc* of 2 branches. Papillæ long and pointed, 2–3 times length of segment. Fan of about 12 hairs, each of 2 branches, attached to fan-plate.

HABITAT.—Tree-holes, rock-pools, cement sinks, drains, iron cisterns, etc.

DISTRIBUTION.—One of the commonest species of the subgenus both in the hills and plains and extending from the NORTH-WEST FRONTIER and BALTISTAN to ASSAM and BURMA and throughout the Indian region to CEYLON. It occurs from sea-level up to 7,000′ or more.

It has not been recorded from beyond the Indian region [*].

82. **Aëdes (Finlaya) elsiæ** Barraud, 1923.

Bull. Ent. Res. xiii, p. 406 (♂ & ♀). TYPE-LOC.: Shillong, Khasi Hills, Assam, vi. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

Aëdes (*Finlaya*) *simulatus* Barraud, 1931, Ind. Journ. Med. Res. xix, p. 611 (♀). TYPE-LOC.: Haflong, Cachar Hills, Assam, viii. 1922 (*Barraud*). TYPE: ♀ in M.S.I. collection, Kasauli.

ADULT [†] (Pl. III, fig. 1).—Distinguished from other species with similarly striped legs by double median yellowish line on thorax [‡]. Wing about 4 mm.

♀.—*Head*: dorsal surface mainly dark, a pale border to eyes and pale scales on nape seen amongst numerous upright dark scales. Antennæ and clypeus dark brown. Palpi with white scaling apically. Proboscis dark brown or black on upper surface, with pale scaling at sides in middle, pale beneath for whole length except for a small dark interruption some distance from apex. *Thorax*: mesonotum deep brown, marked with narrow lines of yellowish scales; a double median line from front continued back and dividing either

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[*] [Represented in the Philippines by the closely-allied *A.* (*F.*) *banksi* Edwards, 1922, which differs chiefly in having the 5th hind tarsal segment white above (black beneath). Probably *A. banksi* is not more than a varietal form of *pseudotæniatus*.]

[†] Barraud 1924 *a*, p. 857; Borel 1928 *b*, p. 51.

[‡] [*A.* (*F.*) *macfarlanei* Edw. of Hong Kong (recorded also from Sumatra by Brug, and from Cochin China by Borel) is rather nearly allied to *elsiæ*, but has proboscis black beneath on distal ¼, most of the abdominal tergites with a pair of creamy spots in middle, white line on anterior surface of hind femur not interrupted, and segment 5 of hind tarsi white.]

side of antescutellar space, a pair of submedian lines ending in front of level of wing-roots, and a pair of curved lines from sides in front, continued over wing-roots. Broad pale scales at base of mid-lobe of scutellum, black at apex; narrow pale scales on lateral lobes. Larger median area of *ppn* with black scales, upper margin with narrow yellow and broad white scales, a patch of broad white scales on lower border. Similar scales on *apn*. *Wings*: a short line of white scales on outer side of costa at base, otherwise dark scaled. *Legs*: femora and tibiæ of fore and mid-legs dark, with narrow pale longitudinal lines running the whole length both in front and behind; hind femur with similar but broader stripes, anterior pale line often narrowly interrupted at some distance from tip; tibia broadly pale beneath only at base. White rings over joint between tibia and 1st tarsal segment on fore and mid-legs, and over the following two or three joints between tarsal segments. Hind leg with similar, but more pronounced, white rings over joints between tarsi, except 4–5; segment 1 with white ring at base; very few pale scales at apex of tibia. *Abdomen*: dorsum dark brown, very narrow basal pale bands on II–VII, wider at sides, not always visible on dorsum owing to shrinkage. Venter mainly yellowish.

♂.—Palpi slightly shorter than proboscis, last two segments slightly curved, with hair-tufts beneath, some white scales at base of apical segment. Other markings as in ♀, but tarsal rings on fore and mid-legs often very small. *Hypopygium* (fig. 37, **d**): style with rather long bristles along apical $\frac{3}{4}$; both stem and blade of harpago of only moderate length and subequal.

LARVA *† (fig. 39, **a**, **c**, **d**).—This has several peculiar characters, *e. g.*, the presence of two pairs of strong spines on dorsum of thorax, and a strong spinulose bristle representing the siphonal hair-tuft. *Frontal hairs B, C, d* in a transverse line towards front at about level of bases of antennæ, *A* slightly posterior; the last with 5–7 branches, *B* 6, and *C* 8. Hair *d* very small and usually single; *e* also single, and fairly long. Preclypeal spines slender. Median hairs of mouth-brushes with small teeth. *Antenna* of moderate length, about 9 times length of greatest width, some small spines

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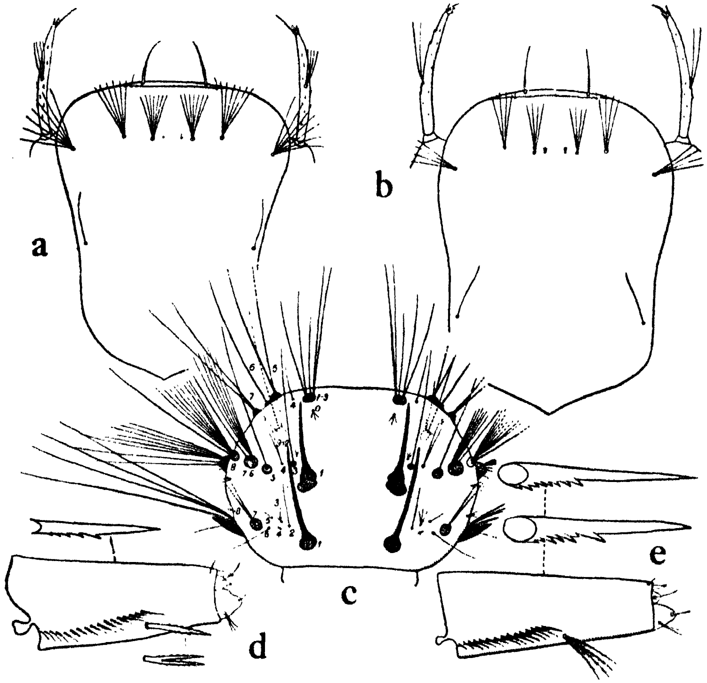
* Barraud 1923 *h*, p. 502; Borel 1928 *b*, p. 53.

† [The larva of *A.* (*F.*) *macfarlanei* Edw. (recently obtained by Dr. R. B. Jackson in Hong Kong) resembles *elsiæ* and *shortti* in having strong spines arising from conspicuous chitinised plates on dorsum of thorax, but differs in having mesothoracic spine double (the two branches subequal) and the more slender metathoracic spine with a short basal barb. Siphonal tuft of 4–5 quite slender branches; *isc* 4–5-branched; *lh* short and single.]

on shaft; hair-tuft at about middle and of 3–5 branches. Hairs on ventral surface of head unusually long and stout. Lateral hairs on *thorax* * and *abdomen* well developed and arising from chitinised tubercles, those on abdominal segments mostly 2-branched. Two pairs of long and strong single spines on thorax, the larger pair on mesothorax, smaller on metathorax, one smaller pair on abdominal segment I; all these have large, chitinised, tubercular bases. Comb of 60–70 fringed

Fig. 39.



Larval structures of *Aëdes*, subgenus *Finlaya*: **a**, **c**, **d**, *elsiæ* (head, thorax, and siphon); **b**, **e**, *shortti* (head and siphon).

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* [The thoracic chætotaxy of this species is shown in fig. 39, **c**, and, apart from the extraordinary transformation of hair 1 of meso- and metathorax into a strong spine, may be taken as typical of the genus *Aëdes*. All the hairs can easily be homologized with those of *Aëdes* (*Ochlerotatus*) as figured by Martini (1923, p. 550); the notation here adopted differs slightly from Martini's, and agrees with that of Puri (1929, 1931), the pleural hairs of each division of the thorax being numbered 9–12; on the mesothorax Martini's hair 9 is numbered 8, and Martini's hair 8 becomes 14. The following points are noteworthy:—*Prothorax*: hairs 1–3 are included in a small plate; 5–6 are very close together, their tubercles confluent; 7 separate, on lateral

teeth in a triangular patch. Subsiphonal tuft of 6–8 frayed branches. *Siphon* 2–3 times length of diameter at base; pecten of 14–19 long sharp teeth, all with quite small lateral denticles; tuft represented by a strong single or bifid spinulose bristle, arising rather more than half-way along tube from base, and usually lying between pectens. Chitinised saddle of *anal segment* covering about ½ the segment, a number of sharp spines on posterior border; *lh* single and rather short; *isc* of 3–4 moderately long branches. Membranous part of segment covered with small hairs. Papillæ very long and tapering to a point, nearly 4 times length of segment. Fan of about 12 hairs, each divided into 2–10 fine branches arising from heavily chitinised fan-plate.

HABITAT.—Rock-pools.

DISTRIBUTION.—ASSAM: type-localities, as given above.

It has been recorded from COCHIN CHINA (*Borel*) [and a male and female agreeing in all respects with Indian specimens have been examined at the British Museum from Wuch'ang, HUPEH, CHINA (*Lan-chou Feng*)].

83. Aëdes (Finlaya) shortti Barraud, 1923*.

Bull. Ent. Res. xiii, p. 405 (♂ & ♀). TYPE-LOC.: Shillong, Khasi Hills, Assam, vi. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT † (Pl. V, fig. 2).—Ornamentation very similar to *A.* (*F.*) *elsiæ*, differing as follows:—

♀.—Proboscis broadly pale only in middle beneath and at sides. Anterior surface of fore and mid-femora speckled with pale scales tending to form broken lines, posteriorly lined with pale scaling for whole length; hind femur with conspicuous white marking near knee, and a line of pale scaling on basal ½ on both surfaces. Tibiæ dark, narrowly

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margin; 8 not visible dorsally; 9–12 definitely ventral in position, only one of this group moderately long, the rest short. *Mesothorax*: hair 1 forms the conspicuous spine; 6 and 7 arise from a small, common plate, 6 forming a large tuft, 7 single; 8 forms a large tuft; 9–12 in a rather small pleural tubercle, 9 forming a tuft, 10 and 11 long and single, 12 minute; 13 small, ventral; 14 latero-ventral (shown dotted in figure). *Methatorax*: hair 1 forming the strong spine; 2–6 all small and separate; 7 fairly large; 8 small; pleural tubercle lateral in position, with a strong spine, and apparently with only 3 hairs (hair 11 missing ?). Compare this figure and description with that of *Tripteroides* (fig. 9, p. 36) and *Culex* (fig. 102, p. 423).]

* [A somewhat damaged ♀ in the British Museum from Gangtok, Sikkim (*Lt.-Col. F. M. Bailey*) apparently represented an undescribed species related to *A.* (*F.*) *shortti*, differing in markings of hind femora, the median white patch on the anterior surface, and the white patch on under surface at tip being much more extensive; median yellowish line of mesonotum apparently single.]

† Barraud 1924 *a*, p. 856.

pale at base and apex ; fore pair with a thin pale line posteriorly in some specimens. Fore and mid-tarsi with white markings at base of first three or four segments and sometimes a few pale scales at apices of segments also. Hind tarsi with four white rings at bases of segments 1–4 ; a few white scales at apices of segments also, not forming definite apical and basal banding.

♂.—Palpi about ¾ length of proboscis, terminal segments with distinct hair-tufts. Proboscis with a small pale marking in middle, not usually forming a complete ring on upper surface. *Hypopygium* (fig. 37, **e**) : style very similar to that of *elsiæ*, but with bristles only on apical ½.

LARVA (fig. 39, **b**, **e**).—Resembles that of *elsiæ* in the presence of large strong spines on dorsum of meso- and metathorax and on abdominal segment I, and in most other details of structure, but metathoracic spine more slender and siphonal tuft of 3–4 strong subplumose or barbed branches.

HABITAT.—Rock-pools.

DISTRIBUTION.—ASSAM : Shillong *, vi. 1922 (*Barraud*) ; Cherrapunji, x. 1920 (*Senior-White* ; Brit. Mus.). KASHMIR : Gulmarg *, x. 1923 (*Sinton*), and Aru *, Lidder Valley, ix. 1930 (*Barraud*).

Recorded from SUMATRA (*Brug*).

84. **Aëdes (Finlaya) greeni** (Theobald), 1903.

M.C. iii, p. 289 (*Howardina*) (♀). TYPE-LOC. : Peradeniya, Ceylon (*Green*). TYPE : ♀ in Brit. Mus.

var. *kanaranus* Barraud, 1924, Ind. Journ. Med. Res. xi, p. 850 (♂ & ♀). TYPE-LOC. : Karwar, N. Kanara, ix. 1921 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT (Pl. III, figs. 5, 6) †.—Distinguished by bright golden scales of mesonotum, white rings extending over tarsal joints, legs not conspicuously lined. Wing 3·5–4 mm.

♀.—*Head* : dorsal surface with a median band of golden scales from nape to vertex, continued along eye-margins and between eyes ; a number of yellow upright scales, chiefly on nape ; a dark patch on either side of median line, and white flat scales at sides. Tori pale brown, flagellum of antenna, clypeus, palpi, and proboscis brownish-black. *Thorax* : mesonotum ornamented with bright golden and dark brown scales, variable in arrangement. In some specimens the front part is covered with golden scales, and posteriorly there is a pair of submedian dark lines and a dark area over each wing-root ; in others there is a fairly large dark area on either side towards the front, and the dark areas posteriorly may be wider, leaving narrow golden lines between, or there may

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† Barraud 1924 *a*, p. 849.

be a pair of submedian dark lines widening out posteriorly, continued to the scutellum. Scutellar scales and those on *ppn* narrow, golden. Postnotum and pleuræ black, latter with irregular patches of broad silvery scales; white lanceolate scales on *apn*. *Wings*: dark scaled. *Legs*: brownish-black, fore and mid-femora broadly pale posteriorly or basal ½, the pale scaling continued as a line to the knee; hind femur white on both surfaces on more than basal ½, except dorsally; small white knee-spots to all femora, those on fore legs minute or even sometimes absent. Tibiæ pale beneath at base, fore pair lined with pale scaling for whole length beneath. Fore tarsi dark or with pale scaling at base of segment 1 and a pale streak beneath; mid-tarsi with white ring at base of segment 1, usually a similar ring over joint between 2 and 3; hind tarsi with white rings at base of segment 1 and over joints between following segments, except at apex of 4, 5 mainly pale dorsally. *Abdomen*: black, with basal silvery bands, wider on sternites than on tergites.

♂.—Palpi ¾ length of proboscis, thin and black, with few outstanding hairs. Hind femur in some specimens entirely white on nearly basal ½. White markings on tarsi usually narrower than in ♀, segment 5 of hind tarsi sometimes only very faintly pale. *Hypopygium* (fig. 37, **k**): coxite has a basal lobe, as well as harpago, both connected with the harpaginal fold. The style is shown separately.

var. *kanaranus*.—This differs in the markings of the mesonotum, the golden scaling being reduced to narrow lines on a dark ground.

LARVA (fig. 40, **a**) *.—Very similar to *christophersi* and *gilli* (*vide* remarks under the former, p. 195).

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION.—Common in the forested regions of the SOUTH-WEST of the Indian Peninsula, in the EASTERN HIMALAYAS, and ASSAM HILLS. Known also from CENTRAL PROVINCES and CEYLON.

It has been recorded from JAVA and SUMATRA.

85. **Aëdes (Finlaya) chrysolineatus** (Theobald), 1907.

M.C. iv, p. 218 (*Howardina*) (♀). TYPE-LOC.: Pundaluoya, Ceylon (*Green*). TYPE: ♀ in Brit. Mus.

Hulecœteomyia trilineata Leicester, in Theobald, 1904, Entom. xxxvii, p. 163 (preocc., Theobald, 1901) (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT † (Pl. III, fig. 8, Pl. IV, fig. 3, and Pl. V, fig. 1).—

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* Barraud 1923 *h*; p. 500; Senior-White 1927, p. 68.

† Theobald 1907, p. 220; Leicester 1908, p. 107; Edwards 1913 *b*, p. 226, and 1922 *d*, p. 466 (syn.); Barraud 1924 *a*, p. 852; Borel 1928 *b*, p. 46 (mostly as *trilineata*).

Belongs to a group of closely allied species characterized by golden lines on mesonotum and broad basal white rings on first three segments of hind tarsi *. Wing about 4 mm.

♀.—*Head*: pale creamy scaling in middle of vertex, along eye-margins, and at sides, two dark areas either side of middle line towards front, many upright scales on nape extending forwards to vertex. Tori brown, flagellum of antenna dark brown; palpi brownish-black, white-tipped. Proboscis pale beneath from near base for more than ½ the length (but amount of pale scaling variable), the pale scaling produced on to upper side to form a wide medial ring, otherwise brownish-black. *Thorax*: mesonotum deep brown or black, marked with sharply defined narrow lines of golden scales; a median line extending from the front back to scutellum, forking in front of antescutellar bare space, a pair of submedian lines which nearly meet a pair of lines curving from sides, and continued to lateral lobes of scutellum; another line of golden scales from wing-root, continued forwards a short distance. Mid-lobe of scutellum with narrow golden scales in centre, flat dark scales on each side, lateral lobes with narrower dark scales. Pleuræ with irregular patches of flat silvery scales, a line of similar scales on *apn*, many similar scales on *ppn*. *Wings*: usually a short line of white scaling on outer or underside of costa at base, otherwise scales are dark. *Legs*: fore femur dark anteriorly except along ventral border, mid-pair with medial pale line along about basal ½, both pairs pale posteriorly for whole length; hind femur dark along dorsal border for whole length, a dark ring near base, broader than in several allied species, and a subapical dark ring, a large white area on each side near middle, anterior white area usually separated from posterior by a narrow ventral line of dark scales, another white streak on outer side ventrally to knee. Fore tibiæ indistinctly pale beneath for whole length, mid- and hind pair narrowly pale at bases only. Tarsi of fore and mid-legs brownish-black, with basal white rings to first two or three segments, hind tarsi with three white rings, that on segment 3 widest and occupying about basal ½ of segment. *Abdomen*: almost black, with yellowish basal bands (sometimes reduced or absent), and large basal lateral silvery spots. White basal bands on sternites; sternite VIII yellowish.

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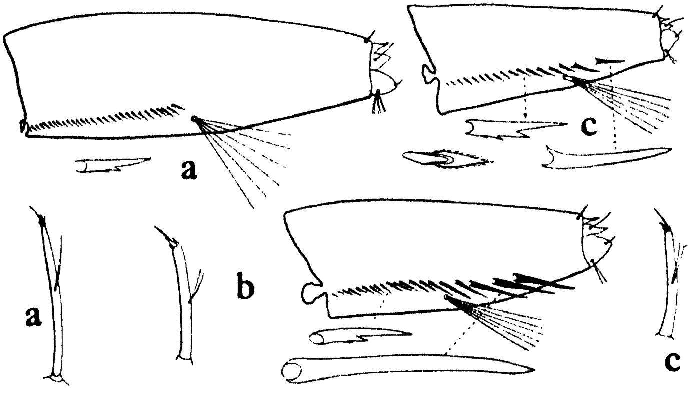
* [Oriental species belonging to this group which have not yet been identified in the Indian area are:—(1) *A.* (*F.*) *jugraensis* Leic. (Malaya), with median golden line of mesonotum running back almost to scutellum without forking, sublateral lines tending to be obsolete, hind femur with comparatively small pale area in middle; (2) *A.* (*F.*) *rizali* Banks (Philippines), with median line of mesonotum running back almost to scutellum without forking, hind femur with basal ½ nearly all whitish; (3) *A.* (*F.*) *japonicus* Theo. (Japan and China), with mesonotal lines broader, less golden, median line tending to be double, hind femur conspicuously white all round at tip, hind tibia dark at base beneath.]

♂.—Palpi slender, upturned, without hair-tufts, a little shorter than proboscis, with three faint pale rings. Proboscis pale for whole length beneath, a narrow pale ring in middle. *Hypopygium* (fig. 37, **g**): blade of harpago curved, tapering, a little longer than stem. Style with terminal appendage a little less than $\frac{1}{3}$ of its length.

LARVA *† (fig. 40, **c**).—*Frontal hairs B*, *C*, *d* almost in a transverse line slightly anterior to level of bases of antennæ; *A* and *B* with 6–7 branches of only moderate length; *C* 5–6-branched; *d* very small, and usually divided into 2 branches; *e* single and fine. Shaft of *antenna* with very few minute spicules and a 2-branched hair at about middle. Hairs on *thorax* and *abdomen* well developed, many on dorsum

Fig. 40.



Larval structures (siphon and antenna) of *Aëdes*, subgenus *Finlaya*: **a**, *greeni*; **b**, *saxicola*; **c**, *chrysolineatus* (with enlarged comb-scale).

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* Barraud 1923 *h*, p. 500; Senior-White 1927, p. 68; Borel 1928, p. 47.

† [The larva of *A.* (*F.*) *japonicus* Theo. (recently obtained by the isolation method by Dr. R. B. Jackson in Hong Kong) resembles *chrysolineatus* in many respects, having 6–8 long, fine branches to the dorso-lateral metathoracic tuft. It differs conspicuously in having a siphon more like *saxicola*, with 2–4 extremely large pecten-teeth beyond the tuft, tip of last tooth almost reaching apex of tube. On the other hand the larva of *A.* (*F.*) *koreicus* Edw., according to specimens obtained by Drs. H. E. Meleney and C. U. Lee in the neighbourhood of Peking in 1926–8, is much more like that of *A.* (*F.*) *pulchriventer*, having all the pecten-teeth alike, more beyond the tuft, and none of the distal ones simple or obviously separated from the rank. These striking differences clearly show how plastic are the larval characters in this group; the adult of *koreicus* is so similar to *japonicus* that it was placed by Edwards, 1932, as a variety of that species.]

being of stellate form ; no large spines on thorax, dorso-lateral hairs of metathorax with 6–8 branches, arising from moderately large tubercle. Comb of 26–30 fringed teeth in a triangular patch. *Siphon* 2–2½ times length of diameter at base. Pecten of 16–19 teeth, with two or three lateral denticles, except the two or three most distal teeth, which are larger, simple, and placed beyond the tuft, though not nearly reaching tip of tube. Hair-tuft of 5–6 long branches, arising at about ⅗ length of tube from base. Chitinised saddle of *anal segment* covering rather more than ½ the segment, posterior border with numerous small spines ; *isc* of 3–4 long branches ; *lh* 3–4-branched and a little longer than the saddle ; 10–12 fan-hairs attached to fan-plate, each hair divided into 3–8 fine branches. Papillæ apparently moderately long and pointed.

HABITAT.—Tree-holes, bamboos, rock-pools. Also roof-gutter and broken chatti (*Senior-White*).

DISTRIBUTION.—BOMBAY : Deccan, Nagargali *, viii. 1921 (*Barraud*) ; North Kanara, Kadra *, ix. 1921 (*Barraud*) ; Yellapur *, x. 1921 (*Barraud*). MALABAR : Pudupadi *, x. 1915 (*Khazan Chand*). E. HIMALAYAS : Kurseong, ix. 1909 (*Annandale*). CEYLON : Pundaluoya and Peradeniya (*Green*) ; Suduganga, Matale dist., 1919 (*Senior-White*).

Known also from MALAY PENINSULA †, COCHIN CHINA, and DUTCH E. INDIES.

86. **Aëdes (Finlaya) harveyi** Barraud, 1923.

Bull. Ent. Res. xiii, p. 407 (♂ & ♀). TYPE-LOC. : Kurseong, Darjeeling dist., ix. 1922 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

var. *nigrorhynchus* Brug, 1913, Arch. Hydrobiol. Supp.-Bd. xi, Bd. 11, p. 28 (see under " Larva ").

ADULT ‡ (Pl. IV, fig. 2).—Closely resembles *A.* (*F.*) *chrysolineatus*, differing chiefly as follows :—Proboscis (in type-form) indistinctly pale beneath in middle only, sides and upper surface dark (in other specimens the pale scaling is more distinct and extends further towards base ; in var. *nigrorhynchus* as described by Brug the proboscis is entirely dark) ; *ppn* less scaly, flat white scales confined to lower posterior corner, scales on upper part narrow and yellowish. Fore and mid-femora with few or no pale scales on anterior surface. Hind femur at tip and hind tibia at base less extensively white beneath. Dorsum of abdomen in ♀ entirely dark, with no trace of pale bands, though tergites have large lateral basal silvery spots (white basal bands present in ♂). ♂ style and harpago as in fig. 37, **g**.

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† [Malayan specimens differ from those from India and Ceylon in having few or no white scales on anterior surfaces of front and middle femur, and apparently no basal bands to abdominal tergites in ♀. In other respects (*e. g.*, scaling of proboscis and *ppn*) they are closely similar to Indian specimens.]

‡ Barraud 1924 *a*, p. 855 ; Brug 1931 *b*, p. 26.

LARVA.—This has not been isolated in India. [The Javan larva described by Brug (1931, p. 27) as *A.* (*F.*) *harveyi* var. *nigrorhynchus* may belong here, though this is not quite certain †. According to Brug's description and figures this larva is similar to the one described below as *A.* (*F.*) *formosensis*, but has a rather longer siphon, with no pecten-teeth beyond the tuft ; *isc* 3-branched, *lh* 2-branched, etc.]

HABITAT (in Java).—Tree-holes (*Brug*).

DISTRIBUTION.—EASTERN HIMALAYAS : Kurseong *, Mungpoo *, Sureil *, Tindharia *, Sukna *, all in Darjeeling dist., ix. & x. 1922 (*Barraud*) ; MADRAS : Coonoor, ix. 1920, on bull (*Senior-White*). One ♀ from Mercara, Coorg, SOUTH INDIA, vi. 1927 (*J. D. Baily*), appears to be this species.

Recorded from DUTCH EAST INDIES (*Brug*).

87. **Aëdes (Finlaya) formosensis** Yamada, 1921.

Annot. Zool. Jap. x, p. 67 (♀). TYPE-LOC. : Kakubanzan, Formosa, v. 1921 (*Hirayama*). TYPE : 2 ♀♀ co-types ; location unknown.

Finlaya khasiana Barraud, 1923, Bull. Ent. Res. xiii, p. 407 (♂ & ♀). TYPE-LOC. : Shillong, Khasi Hills, Assam, vi. 1922 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT ♀ ‡.—Closely resembles *A.* (*F.*) *chrysolineatus*, differing chiefly as follows :—Proboscis with the pale scaling extensive but confined to ventral and lateral surfaces, and scarcely visible from above. Mesonotum with the golden lines not quite so sharply defined. Scales on *ppn* all narrow and pale yellowish. Whitish lines on anterior surfaces of fore and mid-femora sometimes more definite, but apparently variable. Hind femur in types (but apparently not always) with a few dark scales at extreme tip beneath, beyond the white mark ; dark ring at base narrower, only about twice diameter of femur. Abdominal tergites with median basal pale spots separate from the lateral spots, latter smaller and less silvery white ; sternites more extensively dark.

♂.—Palpi slender, upturned, without hair-tufts ; brownish-black, with a definite white ring on long segment and smaller rings at bases of last two segments. Proboscis with a pale area beneath and at sides rather beyond middle ; no other pale scaling. Other markings as in ♀. *Hypopygium* : does not show any marked modifications ; harpago as in fig. 37, **i**.

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† See footnote on next page.

‡ Barraud 1924 *a*, p. 854.

[LARVA.—Not isolated in India. Specimens from Bali † show the following characters :—*Head* dark, including antennæ, which are rather long and almost smooth. *Frontal hairs* well forward, *A* with about 5 branches, *B* 6, *C* 8, *d* 3 ; *B* and *C* almost side by side, *d* small. *Thorax* without conspicuous structures, dorso-lateral tuft of metathorax with 6–7 very long branches, arising from small inconspicuous plate. *Comb* of 25–40 fringed scales, variable in shape. *Siphon* very short, black ; pecten of about 10 teeth with strong basal denticles ; one simple tooth (not specially large) beyond hair-tuft (according to Brug a second simple tooth may be present at extreme tip of tube) ; tuft at $\frac{2}{3}$, 3-branched. *Anal segment* with strongly spinulose hind margin of saddle ; *isc* of 2 long branches ; *lh* single. Papillæ about twice length of saddle.]

HABITAT.—Bamboo-stumps (*Barraud*) ; leaf-axils of *Colocasia* and other plants (*Thienemann* ; *Brug*).

DISTRIBUTION.—ASSAM : Shillong *, vi. 1922 (*Barraud*), and viii. 1928 (*T. B. Fletcher*) ; Golaghat *, xii. 1924 (*Barraud*) ; Nongpoh *, Khasi Hills dist., xi. 1921 (*Christophers*). E. HIMALAYAS : Sureil *, x. 1922 (*Barraud*) ; Kurseong *, viii. 1928 (*Sobha Ram*).

Originally described from FORMOSA ; subsequently recorded from DUTCH E. INDIES (*Brug*).

88. **Aëdes (Finlaya) pallirostris** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 270 (♀). TYPE-LOC. : Assam, Golaghat, Sibsagar dist., ii. 1911 (*Christophers*). TYPE : ♀ in Brit. Mus.

[ADULT ♀ ‡.—Closely resembles *A.* (*F.*) *formosensis*, of which it may be only a variation, but proboscis mainly pale on basal $\frac{4}{5}$, with very few dark scales even on upper surface ; mesonotal golden lines as clearly defined as in *chrysolineatus*, the sublateral lines definitely broken in middle, and some pale scaling towards hind margins of sternites as well as at base. Hind femur in type with some black scales at extreme tip beneath and with narrow black basal ring as in types of *khasiana*.]

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† [Briefly redescribed above from two isolated skins in British Museum from the series described by Brug (1931, p. 26) as *A.* (*F.*) *harveyi*. The corresponding adults, however, are not *harveyi*, but apparently *formosensis* (*khasiana*). In reporting this error of determination to Col. Brug I unfortunately referred to the specimens in question as being from Sumatra, whereas they are from Bali. Perhaps misled by my error regarding the locality, Brug has published a note (1932, p. 399) stating that of the material previously determined by him as *A.* (*F.*) *harveyi* specimens from Sumatra are *khasiana*, those from Java and Bali *harveyi*. It is, perhaps, more likely that those from leaf-axils (Sumatra and Bali) are *formosensis*, those from tree-holes (Java) are *harveyi*, but the matter requires re-investigation. There are no Sumatran or Javan specimens in the British Museum.—F. W. EDWARDS.]

‡ Barraud 1928 *a*, p. 855.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only with certainty from the type-locality.

89. **Aëdes (Finlaya) saxicola** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 466, nom. nov. for *H. fluviatilis* Leic.

Hulecœteomyia fluviatilis Leicester, 1908 (nec Lutz), Cul. Malaya, p. 111 (♂ & ♀). TYPE-LOC.: Ulu Gombak, Malay Penin. (*Leicester*). TYPES: non-existent.

Finlaya greigi Barraud, 1923, Bull. Ent. Res. xiii, p. 406 (♂ & ♀) TYPE-LOC.: Haflong, Cachar Hills, Assam, viii. 1922 (*Barraud*) TYPE: ♂ & ♀ in Brit. Mus.

ADULT * (Pl. III, fig. 2).—Differs from *chrysolineatus* as follows:—Scales in middle of vertex more golden. Proboscis black both above and below. Palpi much more narrowly white-tipped. Mesonotum with the sublateral golden lines on anterior ½ shorter and much less definite, median line rather deeper golden, and broader than in *chrysolineatus*. Scales on *ppn* fewer and confined to posterior margin; narrow and golden above, broader and white below. Sternite VIII of ♀ blackish. Front and mid-femora all dark on anterior surface, or with only indistinct traces of a whitish line towards base; hind femora much less extensively white beneath at tip; hind tibiæ also rather less extensively white beneath at base.

LARVA †‡ (fig. 40, **b**).—*Frontal hairs* and *antenna* much as in *chrysolineatus*. Lateral hairs of *thorax* and *abdomen* very strong and subplumose and arising from chitinised tubercles, a dorso-lateral pair of very strong 4-branched spinulose bristles [representing hair 7] on metathorax, [arising from large chitinised plate; hair 1 on mesothorax fairly slender, bifid, and almost simple, arising from small chitinised tubercle]; a number of strong, spinulose, single bristles on abdomen. Comb of about 60 fringed teeth in a triangular patch. *Siphon* 2·5–3 times length of diameter at base. Acus fairly large. Pecten of about 20 teeth, those between base of siphon and hair-tuft with lateral denticles,

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* Edwards 1923, p. 3; Barraud 1924 *a*, p. 851.

† Barraud 1923 *h*, p. 501; Edwards & Given 1928, p. 344.

‡ [The larva of *A.* (*F.*) *jugraensis* (found in fallen leaves in forest in Malaya) resembles *saxicola* in having hair 7 of metathorax composed of 3–4 remarkably strong spine-like and barbed branches, and arising from a large chitinous plate, but differs in having no simple pecten-teeth beyond hair-tuft on siphon; hair 1 of mesothorax in *jugraensis* is single and stouter than in *saxicola*.]

the 5–6 teeth between hair-tuft and apex very large, strong, and without denticles †; point of last tooth reaching nearly to apex of tube; hair-tuft of 5–6 subplumose branches, arising at about middle of tube. Anal segment very similar to that of *A.* (*F.*) *elsiæ*.

HABITAT.—Rock-pools.

DISTRIBUTION.—ASSAM: Haflong *, Cachar Hills, viii. 1922 (*Barraud*). EASTERN HIMALAYAS: Kurseong *, Darjeeling dist., *c.* 5,000′, ix. 1922 (*Barraud*).

Also known from MALAY PENINSULA (*Leicester*; *Given*; *Hacker*) and Mt. Salak, JAVA (*R. W. Paine*, 1929).

90. **Aëdes (Finlaya) oreophilus** (Edwards), 1916.

Bull. Ent. Res. vi, p. 357 (*Ochlerotatus*) (♀). TYPE-LOC.: Gharia, Murree Hills, W. Himalayas. TYPE: ♀ in Brit. Mus. (from Agric. Res. Inst., Pusa).

ADULT ‡ (Pl. III, fig. 9, and Pl. V, fig. 3).—Distinguished by dark tarsi and other characters given in key. Ornamentation of mesonotum of ♀ and ♂ shown in above-mentioned plates. Both sexes may apparently be distinguished from *A.* (*F.*) *suffusus* by the *ppn* scales being nearly all broad and flat instead of mostly narrow.

♂.—Differs from ♀ in having dorsal surface of head mainly white scaled, without lateral dark patches; mesonotum sparsely covered with pale yellow scales not arranged in lines; palpi a little shorter than proboscis, black, with small tufts on terminal segments. *Hypopygium* (fig. 37, **h**): coxite with dense collection of hairs on about middle of internal border; harpago elbowed at about middle, apical part tapering to tip; style of moderate length, with long terminal appendage.

LARVA (fig. 41, **a**).—*Frontal hairs A*, *B*, and *d* in a transverse row, slightly posterior to bases of antennæ, all branched; *A* with 4–6 branches; *B* 3–5; *d* quite small, usually 3-branched; *C* some distance posterior to and directly behind *B*, fairly long and simple (very rarely split into two), *e* usually with 2 short fine branches. Preclypeal spines strong, pointed, moderately long. *Antenna* with shaft straight, smooth, a very few minute spinelets visible under high magnification, about 9 times length of greatest width; tuft represented by single hair (rarely split), attached rather nearer apex than base of shaft. Median hairs of mouth-brushes with moderate-sized teeth. Mentum broadly triangular, with 9–12 teeth of equal size on either side of central one. Lateral hairs of *thorax* and *abdomen* moderately developed, no special structures on dorsum. Comb of 22–25 comparatively large fringed teeth in three or four rows in triangular patch. *Siphon* 2½–3 times length of diameter at base, slightly tapering,

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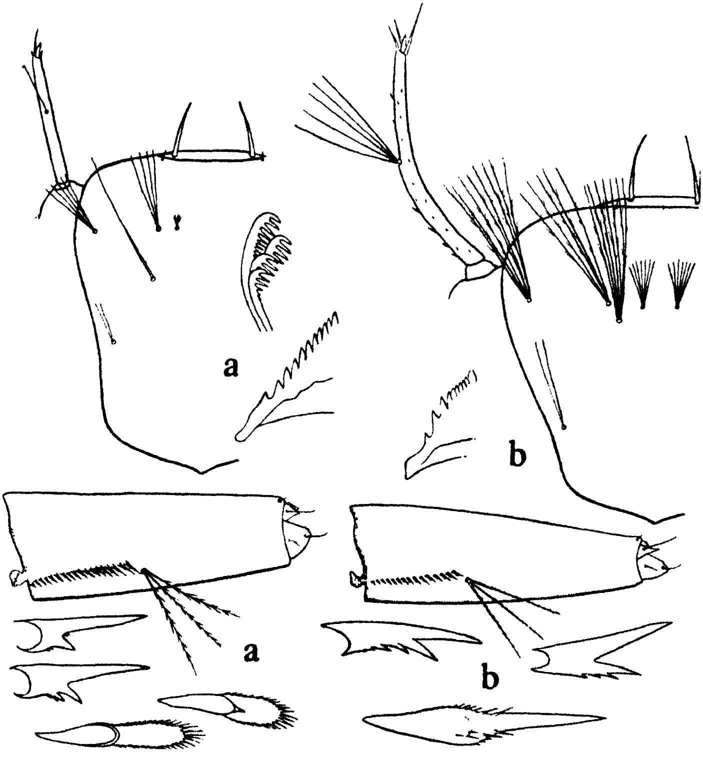
† **[In larvæ from Mt. Salak, Java, the last pecten-teeth are not quite so large as in Indian and Malayan specimens, and there are only 3–4 beyond the tuft; in other respects the larvæ are similar.]**

‡ **Barraud 1924 *a*, p. 860.**

Fig. 41.



Larval structures (head, half mentum, siphon, enlarged pecten-teeth and comb-scales) of *Aëdes*, subgenus *Finlaya*: **a**, *oreophilus* (with enlarged elements of mouth-brush); **b**, *suffusus*.

dark brown, apical ⅕ pale. Acus small. Pecten of 13–21 strong pointed teeth, with one or two large denticles towards base and a few hair-like points; tuft of 3–4 subplumose branches arising at about ⅗ of length from base, and just beyond most distal pecten-tooth. *Anal segment* nearly enclosed by chitinised saddle; *lh* 2-branched and about length of segment; *isc* of 3–4 branches of varying lengths;

osc single and long, as usual. Fan-hairs strong and black, about 12 arising from fan-plate, each divided into 2–4 branches.

HABITAT.—Tree-holes.

DISTRIBUTION.—One of the commoner tree-hole breeding species of the subgenus in W. HIMALAYAS. Found also in E. HIMALAYAS and in Nilgiri Hills, SOUTH INDIA.

Not recorded from beyond the Indian region.

91. **Aëdes (Finlaya) suffusus** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 270(♀). TYPE-LOC. : Simla, viii. 1915 (*Christophers*). TYPE : ♀ in Brit. Mus.

ADULT ♀* (Pl. III, fig. 11).—Resembles *A.* (*F.*) *oreophilus* very closely, differing as follows :—Dorsal surface of head covered with lanceolate yellowish-white scales, no definite dark areas, numerous dark upright scales on nape. Narrow scales on upper part of *ppn*, instead of all scales on this part being broad and flat. Mesonotum covered with yellow and brownish scales, not arranged in definite lines, a pair of indistinct submedian dark lines.

♂.—Differs from that sex of *oreophilus* in scaling of *ppn*, as above. *Hypopygium* : does not show any very marked differences from allied species.

LARVA (fig. 41, **b**).—*Frontal hairs A*, *B*, *C*, and *d* all well developed and branched ; *A*, *B*, *d* in transverse row slightly posterior to level of bases of antennæ, *C* slightly internal and posterior to *B*, *A* with 8–11 branches, *B* 5, *C* and *d* 8–10, *e* 2-branched. *Antenna* comparatively long and curved ; shaft about 14 times length of greatest width ; scattered small spinelets along its length ; hair-tuft of 5–6 branches at about middle. Mouth-brush hairs simple. Mentum with 9–11 teeth either side of larger median tooth, lateral teeth larger near base than those near apex. Lateral hairs of *thorax* and *abdomen* long and fine ; stellate hairs present on dorsum of thorax and abdominal segments. Comb of 8–14 comparatively large, sharply pointed teeth in an irregular row. *Siphon* dark brown, about 3 times length of diameter at base ; pecten 16–21 teeth along basal $\frac{1}{3}$ of tube, each tooth, with one large and several smaller denticles. Siphonal tuft usually of 3 branches, at about $\frac{1}{3}$ from base. Acus moderately developed. Saddle covering about $\frac{1}{2}$ *anal segment* in side-view ; *lh* of 3 fine branches ; *isc* 5–6, 3 or 4 times length of saddle ; fan of few long branches, fan-plate rudimentary. Ventral papillæ about length of saddle, dorsal pair a little longer, both pairs bluntly pointed. The larva is remarkably distinct from that of *oreophilus*.

HABITAT.—Tree-holes.

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* Barraud 1924 *a*, p. 861.

DISTRIBUTION.—W. HIMALAYAS only : Simla * ; Krol Mt.*, near Solan (Kalka-Simla road) ; Fagu * (Hindustan-Tibet road), vii.-viii. 1923–1930 (*Barraud*) ; all 7–8,000′.

92. **Aëdes (Finlaya) christophersi** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 267 (♀). TYPE-LOC. : Simla, viii, 1915 (*Christophers*). TYPE : ♀ in Brit. Mus.

ADULT † (Pl. III, fig. 12).—Characterized by thoracic adornment and three basally-ringed hind tarsal segments. Wing about 4·5 mm.

♀.—*Head* : dorsal surface covered with narrow pale ochreous scales and scattered upright scales, latter chiefly towards nape. Tori brown, flagellum of antenna, clypeus, palpi, and proboscis black ; palpi about ⅙ length of proboscis. *Thorax* : a median line of yellowish scales, continued back from the front and dividing either side of antescutellar space, bordered on either side by a broader band of brownish-black scales ; laterally on sides in front scales are all yellowish, each of these areas divided posteriorly into two lines of pale scales, one running to lateral lobe of scutellum and one to wing-root, space between brownish-black. Scutellar scales narrow and yellow. Postnotum and integument of pleuræ dark brown or black. Some fairly broad white scales on *apn* and on lower part of *ppn*, narrow yellow scales on upper part of latter ; irregular patches of broad silvery scales on pleuræ. *Wings* : dark scaled. *Legs* : bluish-black, with white markings ; all femora with white knee-spots and white scaling from base, chiefly posteriorly and ventrally ; hind femur white on both sides for basal ½ or rather more. Tibiæ dark, hind pair narrowly pale beneath at base. Tarsi with narrow basal white markings to first two segments on fore and mid-legs ; similar but wider rings to first three segments on hind legs. *Abdomen* : black, with basal white bands to tergites and sternites, latter with some apical white scaling also.

♂.—*Palpi* black, little shorter than proboscis, the terminal segments not perceptibly swollen and with few outstanding hairs. Mesonotum almost entirely covered with ochreous scales, the dark stripes present in ♀ being indistinct or absent. Other markings as in ♀. *Hypopygium* : style and harpago as shown in fig. 37, **l**.

LARVA (fig. 42, **b**).—Very similar to *A.* (*F.*) *gilli* and *greeni*, differing from former in having only one pair of frontal hairs (*B*) single and very long, longer than whole head. Preclypeal spines fairly long and very slender. Antennal

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† Barraud 1924 *a*, p. 861.

hair of 2 branches (each branch again occasionally split into two). Comb of 40–50 teeth. Pecten usually of 19–22 teeth, but occasionally more. Siphonal tuft of 3–5 fairly long fine branches ; *isc* of only 2 branches. Anal papillæ with rounded ends, dorsal pair longer than segment.

From *A.* (*F.*) *greeni* this larva appears to differ only in the shape of the anal papillæ, the dorsal pair of which in *greeni* are only about the length of the anal segment, the ventral pair shorter, both with pointed ends. The siphonal hair-tuft has usually 5–6 branches in *greeni*.

HABITAT.—Tree-holes.

DISTRIBUTION.—KASHMIR : Gulmarg, 1913 (*Wyville-Thomson*). W. HIMALAYAS : Simla *, viii. 1915 (*Christophers*), viii. 1923, viii. & ix. 1924, and ix. 1930 (*Barraud*) ; Fagu * (Hindustan-Tibet road), viii. 1923 (*Barraud*) ; Krol Mt., near Solan (Kalka-Simla road), ix. 1924, vii. & viii. 1930 (*Barraud*); Murree *, 1922 (*Gill*).

Not known from elsewhere.

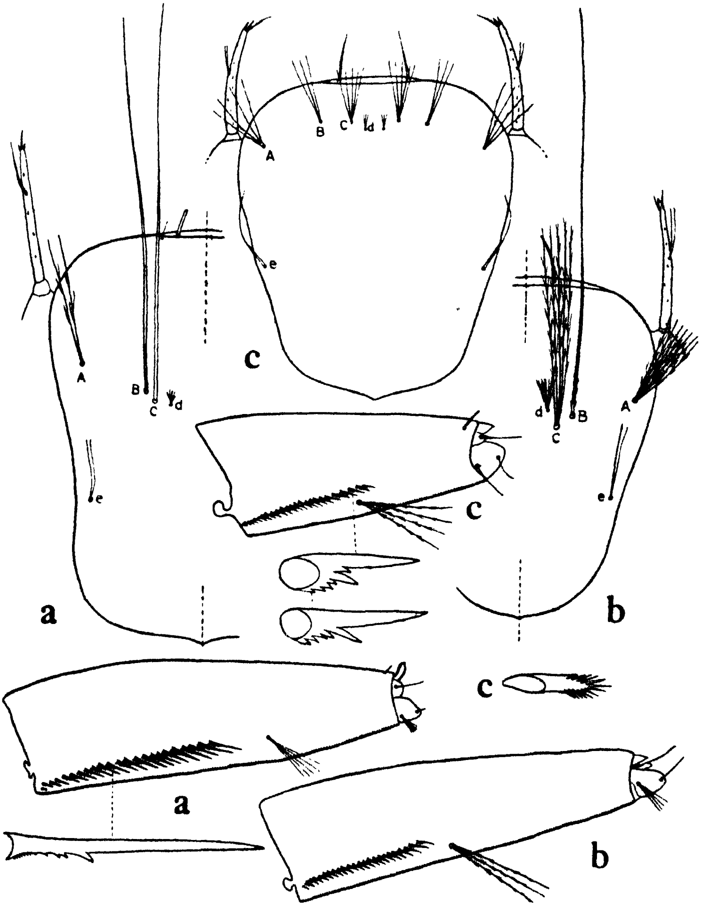
93. **Aëdes (Finlaya) gilli** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1000 (♂ & ♀). TYPE-LOC. : Krol Mt. near Solan (Kalka-Simla road), 7,000′, viii. 1923 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—Distinguished by ochreous-scaled thorax and basal white rings on first three hind tarsal segments. Wing about 4·5 mm.

♀.—*Head* : dorsal surface covered with flat pale yellow scales and some upright scales of same colour, latter chiefly confined to nape ; a patch of pale yellowish narrow scales on nape, and a narrow stripe of similar scales extending forwards to eyes ; dark flat scales at sides of head. Antennæ, clypeus, palpi, and proboscis brownish-black ; palpi about ¼ length of proboscis. *Thorax* : anterior ½, or rather more, of mesonotum entirely covered with pale golden or ochreous narrow scales ; this area ends irregularly in front of level of wing-roots, posterior part covered with dark brown and yellowish scales, the latter arranged chiefly in three lines to scutellum ; a small area of white scales in front of each wing-root. Scutellar scales narrow and yellow. Postnotum brown, integument of pleuræ darker ; scales on *apn* rather broad and white ; *ppn* almost covered with broad, flat, pale yellowish scales, a few narrower ones on upper margin. *Wings* : dark scaled. *Legs* : bronzy black, marked with dull white ; fore femur dark, except for a narrow white ring at base and on basal ½ posteriorly ; mid-femur with similar narrow basal white ring and with a ventral pale streak on anterior surface, broadly pale on basal ½ posteriorly; hind femur pale on both surfaces on about basal ½; all femora sometimes with faint knee-spots, chiefly on posterior aspect. Tibiæ dark brown, pale at base, and streaked with pale scaling posteriorly; hind tibia rather broadly pale at base beneath. Tarsi with pale scaling or pale rings at bases of segments 1 and 2 on fore and mid-legs; wider pale rings on first three segments of hind legs. *Abdomen*: brownish-black, with narrow basal pale bands on segments 2–6 (sometimes invisible in bred specimens owing to shrinkage)

Fig. 42.



Larval structures of *Aëdes*, subgenus *Finlaya*: **a**, *gilli*; **b**, *christophersi*; **c**, *pulchriventer* (with two enlarged pecten-teeth and one comb-scale).

and with basal lateral silvery patches, largest on VI and VII. Sternites pale, with apical dark bands.

♂.—*Palpi* a little shorter than proboscis, apical segments slightly swollen, turned downwards, and hairy; some pale scales at base of apical segment dorsally. Scales on head, mesonotum, and scutellum mainly white, not yellow. Other markings as in ♀. *Hypopygium*: does not show any marked modifications.

LARVA (fig. 42, **a**).—Most nearly resembles *christophersi* and *greeni*. *Frontal hair A* of 2–3 fairly long fine branches; *B* and *C* both single and very long, as long as, or longer than, the whole head, which is itself comparatively large. Maxillæ large and prominent; mouth-brush hairs simple. Preclypeal spines slender and rather short. *Antenna* fairly long and slender, about 12 times length of width; shaft with few fine spicules and a single hair attached at nearly ⅔ of length from base. Lateral hairs on *thorax* and on first two abdominal segments fairly well developed, no special structures on thorax. *Abdomen*: hairs on III–VIII small and fine. Comb of about 70 fringed teeth in a patch. *Siphon* deep brown or black, 4–5 times length of diameter at base; pecten of about 24–28 long teeth, with lateral denticles on basal ⅓, one or two of these large, others much smaller; tuft attached some distance beyond pecten, of 6–9 fine branches, often difficult to see against the dark siphon (in *christophersi* the tuft is larger). Dorsal ½ of *anal segment* covered with dark brown saddle; *lh* of 3–5 fine short branches; *isc* of 6–8 branches of varying lengths, outer single and long as usual. Fan of moderate size, about 10 hairs, each divided into a number of branches, several hairs arising from membranous part of segment. Dorsal papillæ long and pointed, about length of longest fan-hairs; ventral pair about ½ this length.

HABITAT.—Tree-holes.

DISTRIBUTION.—W. HIMALAYAS: Krol Mt. *, near Solan; Simla *; and Fagu * (Hindustan-Tibet road), vii.–viii. 1923–1930 (*Barraud*); Bhowali *, Naini Tal dist., vii. 1925 (*S. Sundar Rao*).

Not recorded from elsewhere.

94. Aëdes (Finlaya) simlensis Edwards, 1922.

Ind. Journ. Med. Res. x, p. 269 (♀). TYPE-LOC.: Simla, viii.–ix. 1925 (*Christophers*). TYPE: ♀ in Brit. Mus.

ADULT ♀ †.—Differs from *A.* (*F.*) *gilli* chiefly as follows:— Fewer narrow scales on nape and none extending forwards in middle line to vertex. Scales on *apn* all rather narrow and curved. Hind femur white on rather more than basal ½ on outer side, rather less so on inner side; all knees dark. Fore tibia blackish all round, except narrowly at base. Hind tibia more narrowly pale at base beneath.

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† Barraud 1924 *a*, p. 862.

♂ and LARVA.—Unknown.

HABITAT.—Tree-holes.

DISTRIBUTION.—W. HIMALAYAS only, not common: Simla * (*Christophers*); Lansdowne *, ix. 1923 (Ind. Stn. Hosp.); Bhowali *, vi. 1925 (*S. Sundar Rao*); Muktesar *, Kumaon, ix. 1922 (*T. B. Fletcher*); all 7–8,000′.

95. **Aëdes (Finlaya) pulchriventer** (Giles), 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 608 (*Culex*) (♂ & ♀). TYPE-LOC.: Naini Tal, W. Himalayas (*Giles*). TYPE: ♂ & ♀ in Brit. Mus.

Howardina himalayana Giles, 1904, Journ. Trop. Med. vii, p. 384. TYPE-LOC.: Naini Tal, W. Himalayas. TYPE: ♂ in Brit. Mus.

ADULT †.—Recognized by dark tarsi and conspicuous orange patches on abdominal sternites. Wing about 5 mm.

♀.—*Head*: dorsal surface covered with narrow golden scales and numerous dark upright scales, latter chiefly on nape; indefinite dark patches on either side in front and lower down at sides. Tori light brown, flagellum of antenna, clypeus, palpi, and proboscis black; clypeus and palpi with a few golden scales in most specimens; palpi about ⅙ length of proboscis. *Thorax*: mesonotum covered with golden and brownish-black scales, former arranged chiefly in a wide median area from front, narrowing posteriorly and dividing either side of antescutellar space, and in a curved line each side over wing-roots. Scutellar scales narrow and golden. Postnotum brown; pleuræ almost black, with irregular patches of silvery flat scales; pale, fairly broad scales on *apn*; narrow golden scales on upper and posterior margins of *ppn*. *Wings*: dark scaled. *Legs*: brownish-black, all femora with pale knee-spots; fore femur dark anteriorly, narrowly pale posteriorly for nearly whole length; mid-femur with some golden scales on anterior surface forming an indistinct line on a dark ground, pale posteriorly on basal ½; hind femur pale on both surfaces on basal ½ except dorsally. *Abdomen*: dorsum black, with narrow basal silvery bands on II–VII, some orange scales on lateral margins of tergites; sternites with narrow white basal bands, narrow black medial bands; remainder covered with orange scales.

♂.—Palpi about ⅘ length of proboscis, last two segments with small hair-tufts. Ornamentation as in ♀. *Hypopygium* (fig. 43, **a**): form of 9*t*, coxite, and harpago characteristic.

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† Theobald 1901 *b*, p. 48 (*Culex*), 1910 *b*, p. 221; Edwards 1913 *b*, p. 228 (*Ochlorotatus*, syn.); Barraud 1924 *a*, p. 863.

LARVA (fig. 42, **c**).—*Frontal hairs A*, *B*, *C* in a convex row towards front of clypeus, *d* slightly posterior and internal to *C*; *A* with 3–6 branches, *B* with 2–4, *C* with 3–6, *d* small, with 3 fine branches, *e* almost always single and long. Preclypeal spines fairly long and slender. Median hairs of mouth-brushes with moderately large teeth. *Antenna* comparatively short, 8–10 times length of greatest width, shaft with small spines; hair usually of 2 branches (sometimes 3 or 4), attached rather nearer apex than base. Mentum very similar to that of *oreophilus*, 12–15 teeth either side of median one. Lateral hairs of *thorax* well developed, arising from chitinised tubercles; stellate hairs of 3–5 short, strong branches on thorax and *abdomen*. Comb of 30 or more scale-like teeth, with fringed ends. Subsiphonal tuft of 8–12 branches. *Siphon* dark brown, 2½–3 times length of diameter at base; pecten usually of 20–22 teeth (variation 18–28), extending along more than basal ½ of siphon, sometimes beyond base of hair-tuft, latter with about 4 branches. Pecten-teeth strong, with 4–6 basal denticles. Acus of moderate size. Saddle covering rather less than ½ of *anal segment* in side view, posterior margin with small, strong spines; remainder of saddle, as well as siphon, covered with small ridges, many of which carry small points; *lh* long and single, about 3 times length of saddle; *isc* usually 4-branched, and 3–4 times length of saddle. Both pairs of anal papillæ long and pointed, nearly twice length of saddle. Fan of 12–14 hairs, each dividing some distance from base into branches.

HABITAT.—Small pools and pot-holes in stream-beds, and tree-holes.

DISTRIBUTION.—Common along the HIMALAYAS from Dungagali *, Hazara dist. (*T. B. Fletcher*); Abbotabad *; KASHMIR (Gulmarg, etc., *Sinton*); to Sikkim border (Yatung *, Tibet, *F. M. Bailey*); and found in ASSAM HILLS (Cherrapunji, *Senior-White*). It is one of the commoner species breeding in both rock-pools and tree-holes in the Simla Hills.

Not recorded from outside the Indian area.

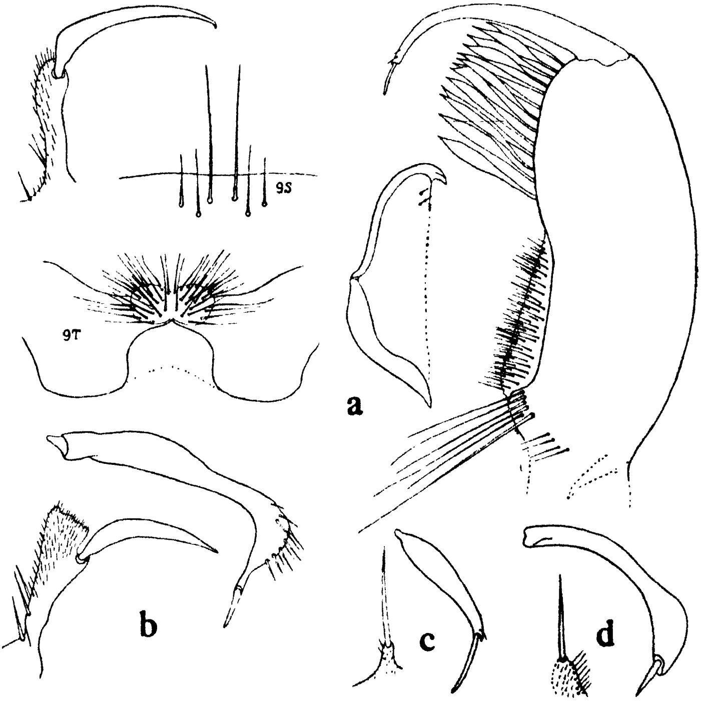
96. **Aëdes (Finlaya) sintoni** Barraud, 1924.

Ind. Journ. Med. Res. ii, p. 967 (♂ & ♀). TYPE-LOC.: Ferozepore Nullah, near Tangmarg, Kashmir, over 7,000′, ix. 1923 (*Sinton*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Recognized by the largely dark thorax and presence of pale rings over some tarsal joints. Wing rather over 5 mm.

♀.—*Head*: a triangular area of creamy narrow scales on vertex, a border of similar scales to eyes, a black area on either side towards front, a patch of broad white scales low down at each side, dark upright scales on nape. Palpi black, with a few pale scales at apices; about $\frac{1}{8}$ length of proboscis; latter entirely dark and noticeably long, longer than fore femur. *Thorax*: mesonotum mainly covered with brownish-black scales, creamy narrow scales on anterior margin arranged in three small patches, the lateral patches continued as a pale scaled line on each side to wing-root; a line of similar scales from front on each side curving over wing-root and continued to lateral lobe of scutellum; antescutellar bare space bordered with pale scales. Lanceolate white scales on mid-lobe of scutellum, narrower pale scales on lateral lobes. Broad pale scales on anterior and posterior margins of *ppn* and on *apn*. Patches of broad white flat scales on sternopleura and upper part of mesepimeron. *Wings*: dark scaled. *Legs*: black; a pale knee-spot on each femur, a few pale scales on anterior surface of fore and mid-pairs, chiefly along ventral border, posteriorly more extensively pale; hind

Fig. 43.



♂ hypopygial details of *Aëdes*, subgenus *Finlaya*: **a**, *pulchriventer*; **b**, *sintoni*; **c**, *dissimilis*; **d**, *subsimilis*.

femur pale on both sides on basal ½, the pale scaling continued in a line towards knee. Tibiæ black, except for small pale markings at base and apex, not forming definite rings. Tarsi with narrow pale rings at base and apex of segment 1 and base of 2 ; a few pale scales over joints between succeeding segments in some specimens. *Abdomen* : tergites black, with basal silvery bands ; sternites with lateral basal and median apical patches of pale scales.

♂.—Palpi a little less than ¾ length of proboscis, black, with indication of a pale ring on long segment, last two segments turned downwards and bearing moderate tufts of brown hairs. Other markings as in ♀. *Hypopygium* : in several respects resembles *A.* (*F.*) *pulchriventer*, but style and harpago (fig. 43, **b**) of different form, and characteristic of this species.

LARVA.—Unknown.

HABITAT.—Rock-pools in stream-beds.

DISTRIBUTION.—KASHMIR * (as above). W. HIMALAYAS : Murree *, 1922 (*Gill*).

97. **Aëdes (Finlaya) auronitens** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 268 (♂ & ♀). TYPE-LOC. : Simla, viii.–ix. 1915 (*Christophers*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT ♀ †.—Resembles *A.* (*F.*) *pulchriventer* in having orange patches on abdominal sternites, but differs as follows :—Dorsal surface of head covered with narrow yellow and upright scales without any dark areas ; tibiæ pale at base, most pronounced on hind legs ; fore tarsi with basal pale markings to first two or three segments, mid-tarsi with similar markings on first three segments, hind tarsi with narrow basal pale rings on segments 1–4, that on 1 being the widest.

♂.—Palpi very slightly shorter than proboscis, slender, brownish-black, last two segments with few long hairs, not forming tufts. *Hypopygium* : resembles that of *A.* (*F.*) *christophersi.*

LARVA †.—Resembles the larvæ of *A.* (*F.*) *christophersi* and *greeni* very closely. Only three incomplete larval skins are available, one or more pairs of clypeal hairs being missing in each. The position of frontal hairs agrees with *christophersi*, and *A* and *C* both have a number of fairly long branches. Anal papillæ longer than in *greeni*, siphonal tuft of more branches (5–6) than in *christophersi*. Further material required before a more complete description can be given.

HABITAT.—Tree-holes.

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† Barraud 1924 *a*, p. 864.

DISTRIBUTION.—W. HIMALAYAS only: Simla *, 8,000′, 1915 (*Christophers*), viii. 1923, viii. & ix. 1924 (*Barraud*); Krol Mt. *, near Solan (Kalka-Simla road), 7,000′, viii. 1923, viii. & ix. 1924, viii. 1930 (*Barraud*); Muktesar *, Kumaon, 7,000′, iv.-v. 1923 (*T. B. Fletcher*).

98. **Aëdes (Finlaya) subsimilis** Barraud, 1927.

Ind. Journ. Med. Res. xiv, p. 552 (♂). TYPE-LOC.: Sukna, Darjeeling dist., 500′, ix. 1922 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT.—Resembles *A.* (*F.*) *dissimilis*, but differs in presence of white markings on palpi and tarsi, and in other details. Wing about 2·8 mm.

♀.—Unknown.

♂.—*Head*: vertex covered with flat black scales, a patch of silvery-white scales on each side, a very few dark upright scales on nape, orbital bristles black. Tori dark brown, some silvery scales in space between them. Antennal shaft and hairs brown. Clypeus dark. Palpi about length of proboscis, slender, without hair-tufts, mainly black scaled, but with a white ring nearer base than apex and some white scaling on upper and inner sides at base. Proboscis dark, about length of fore femur. *Thorax*: mesonotum covered with dark brown scales, bristles brown. Scutellar scales brownish-black, flat on all lobes. Postnotum dark brown. Silvery-white flat scales on *apn*, also on upper and lower parts of sternopleura and upper part of mesepimeron; *ppn* without scales, 4–5 *ppn* bristles. *Wings*: dark scaled. *Legs*: brownish-black; femora yellowish ventrally, small white knee-spots dorsally on all femora. Tibiæ dark, with very few pale scales at tips. Fore tarsi with small basal dorsal white markings on segments 1 and 2, not forming complete rings; similar markings on first three segments of mid-tarsi; hind tarsi with narrow basal white rings to segments 1–3, 4 entirely white except at tip, 5 dark. *Abdomen*: tergites dark brown, faintly paler at base on I–V, lateral silvery patches commencing near base of each and not continued to the hind borders. *Hypopygium* (fig. 43, **d**): coxite about 3½ times length of greatest width in dorsal or ventral view. Style moderately long, widened towards tip, with short terminal appendage. Harpago represented by a single spine, somewhat similar to that of *A.* (*F.*) *similis*.

LARVA.—Unknown.

HABITAT.—Hollow bamboos.

DISTRIBUTION.—Known only from the type-locality.

99. **Aëdes (Finlaya) dissimilis** (Leicester), 1908.

Cul. Malaya, p. 91 (*Stegomyia*) (♂ & ♀). TYPE-LOC. : Ampang, Malay Penin. (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.

var. *karwari* Barraud, 1924, p. 865 (♀). TYPE-LOC. : Karwar, N. Kanara, ix. 1921 (*Barraud*). TYPE : ♀ in Brit. Mus.

ADULT * (Pl. III, fig. 16, and Pl. IV, fig. 6).—Recognized by dark tarsi and silvery flat scales on *ppn*. Wing about 3 mm.

♀.—*Head* : dorsal surface mainly covered with flat black scales, a triangular area of flat white scales in middle in front, continued as a narrow border to eye-margins, a few yellow upright scales on nape. Antennæ, clypeus, palpi, and proboscis black, the last slender, and longer than fore femur ; palpi about ⅙ length of proboscis. *Thorax* : mesonotum almost entirely covered with black scales ; usually a patch of golden scales a little distance in front of wing-roots and towards middle of mesonotum, more numerous in some specimens than in others, sometimes also a more or less pronounced median golden line. A patch of flat silvery scales laterally in front of each wing-root ; similar scales completely covering *ppn* and on *apn* and larger part of pleuræ. *Wings* : black scaled, membrane with pronounced green, blue, and purple reflections. *Legs* : fore legs almost entirely black ; mid-femur with a silvery streak in middle on anterior surface, and another ventrally at knee both in front and behind ; hind femur silvery-white, with a dark dorsal mark on apical ½, not usually forming a complete ring. Tibiæ and tarsi black. *Abdomen* : black, with large silvery basal patches ; sternites with silvery basal bands.

♂.—Palpi a little shorter than proboscis, black, with small terminal hair-tufts. Mesonotum in some specimens entirely covered with golden scales, in others the sides of mesonotum are dark. *Hypopygium* (fig. 43, **c**) : differs from other species in the subgenus (except *subsimilis*) in shape of harpago, which is straight and resembles a bristle. Style short, with a terminal appendage about ½ its length.

var. *karwari* , ♀.—Differs from type-form in having mesonotum almost entirely covered with golden scales, as in ♂.

LARVA.—*Frontal hairs A*, *B*, *C*, *d* all posterior to the level of bases of antennæ ; *A* with 7–8 branches ; *B* and *C* single and long, standing one behind the other ; *d* small, with 4–6 branches, placed internal to *B* ; *e* usually with 2 fine branches. Preclypeal spines slender. *Antenna* with long smooth shaft, about 14 times length of greatest width, and a single hair at about middle. Hairs of mouth-brushes simple. Mentum with usually 14 close-set teeth on either side of a large central one. Lateral hairs of *thorax* and

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* Barraud 1924 *a*, p. 864.

abdomen moderately developed, no stellate hairs or special structures on dorsum. Comb of 60–70 close-set teeth in a triangular patch, each tooth ending in a number of fine points. *Siphon* dark brown, about 3 times length of diameter at base. Acus small. Pecten of 22–25 sharp teeth, each with 2–3 lateral denticles at base. Hair-tuft of about 4 fine branches, at about middle of tube, its base just beyond most distal pecten-tooth ; some long fine hairs on valves. Saddle covering rather more than ½ *anal segment*, without spines on border ; *lh* of 4–5 fine branches ; *isc* of 5–7 rather fine fairly long branches. Papillæ long and pointed, dorsal pair about length of *isc*. Fan of about 10 hairs, several of which are attached to membrane between fan-plate and base of segment.

HABITAT.—Tree-holes.

DISTRIBUTION.—A fairly common forest species in S.W. and N.E. INDIA, where there is a heavy rainfall. No specimens have been seen from Burma, but it no doubt occurs there.

Known also from MALAY PENINSULA.

100. **Aëdes (Finlaya) albolateralis** (Theobald), 1908.

Rec. Ind. Mus. ii, p. 289 (*Stegomyia*) (♀). TYPE-LOC. : Sylhet, Assam, ix. 1905 (*Hall*), and Lungleh, Lushai Hills, Assam, vii. 1904. TYPE : ♀♀ in Ind. Mus.

Until recently this species has been considered synonymous with *A.* (*F.*) *niveus* (Ludl.), but Brug (1931) found that several forms or species have been confused under the last name. One of these is almost certainly *A.* (*F.*) *albolateralis*, described by Theobald from Assam. Unfortunately, so far as is known at present, this, and other forms, can only be distinguished from one another with certainty on details of structure of the ♂ hypopygia, or on the morphology of the larvæ. From examination of Indian specimens it appears that the commonest and most widely distributed is the one now considered to be *albolateralis*. The type-form of *A.* (*F.*) *niveus*, as interpreted by Brug, has been found in the Andamans and South Bengal, and there are three others, differing in ♂ hypopygial structure, one of which appears to be the form described by Brug as var. *B*. This form is known also from Indo-China, Sumatra, and Java. These three forms are here treated as distinct species, although it is possible that one or more of them may eventually be shown to be varieties of *A.* (*F.*) *niveus* *.

The following description has been made from specimens of *A.* (*F.*) *albolateralis* from Kasauli, Western Himalayas, where other forms resembling this species do not appear to occur.

ADULT †.—Resembles other species of the group in having flat scales on head and scutellum, large silvery patch on front of mesonotum (often divided in ♀), and dark legs, with basal ⅔ of hind femur white. Wing about 3 mm.

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* [In addition to the forms here discussed, *A.* (*F.*) *pseudoniveus* Theo. (=*subniveus* Edw.), of Borneo, Singapore, and Sumatra, belongs to this group. It differs from the five Indian forms in the presence of a silvery spot in middle of anterior surface of middle femora. ♂ and larva unknown.]

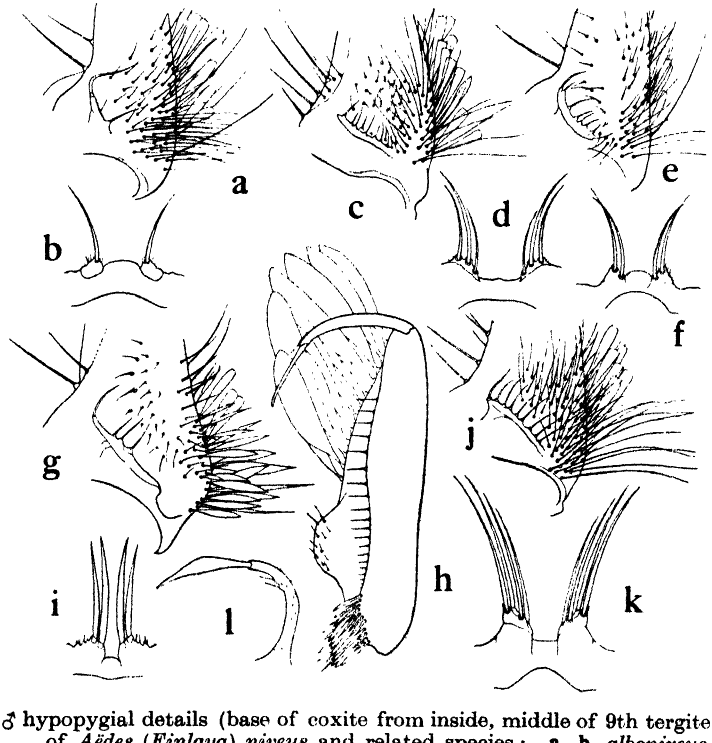
† Edwards 1921 c, p. 318 (*niveus*) ; Barraud 1923 *g*, p. 480 (*nivea*) ; Brug 1931 *b*, p. 24 (*niveus*, var. *A*).

♀.—*Head*: a narrow border of silvery scales to eye-margins, rather wider in middle on front of vertex; remainder covered with flat black scales, faintly paler towards sides in some specimens; a few dark upright scales on nape. Antennæ, clypeus, palpi, and proboscis black; proboscis about length of fore femur; palpi short, only about ⅐ or ⅛ length of proboscis. *Thorax*: mesonotum with a large silvery-white area on either side in front, usually some silvery scales on front margin in middle, or more extensive silvery-white scaling tending to unite the lateral patches in one large area; remainder brownish-black, but usually white scales on either side of the antescutellar bare space. Scutellar scales flat on all lobes, white, brownish, or dark brown, variable in proportions. Integument of pleuræ almost black; patches of silvery flat scales, one covering larger part of mesepimeron, another large area in front of this, and another below, also smaller patches on coxæ, propleura, and *apn*; *ppn* bare. *Wings*: dark scaled. *Legs*: fore femur black anteriorly, a pale streak on basal ½ beneath; mid-femur similar, but more extensively pale posteriorly, and usually with some silvery scaling on ventral border on anterior surface; hind femur entirely white on basal ⅔ or more. Tibiæ and tarsi entirely brownish-black. *Abdomen*: black, with large white lateral, basal, wedge-shaped markings, not produced far on to dorsum on II–IV, but forming narrow basal bands on V–VII. Sternites mainly dark, V–VII usually somewhat projecting, VIII fairly large, without scales; cerci scarcely visible.

♂.—*Head*: scales mostly creamy or light brown, but appearing darker in some lights, scales at sides lighter; in some specimens the dorsal surface of head appears much lighter than in others. Palpi black, a little shorter than proboscis, terminal segments with a moderate number of long hairs. Antennal plumes fairly dense, brown. *Thorax*: white patch on mesonotum usually complete and covering anterior ⅔, but few or no white scales above wing-roots, and not many bordering bare antescutellar space. Other markings very similar to those of ♀. *Hypopygium* (fig. 44, **g**, **h**, **i**): 9*t* narrow, with a pair of small submedian lobes close together, each with 2–4 strong flattened bristles. Coxite with a group of very large scales on ventral border near apex; dorsal border with a row of hairs, and a collection of long lanceolate scales at base (this last character distinguishing this species from allied forms). Style with terminal appendage nearly ½ its length.

LARVA (fig. 45, **c**–**f**).—*Frontal hairs* *A*, *B*, and *d* in a transverse row slightly posterior to level of bases of antennæ; *C* almost directly behind *B*; *A* with 6–8 branches; *B* with 4–10, more usually 7; *C* with 5–11; *d* with 7–10, this hair being comparatively well developed; *e* single or split into 2. Preclypeal spines long and slender. Mouth-brush hairs simple. *Antenna* rather long and stout, some spines on curved shaft; hair-tuft at about middle, with 6–7 branches. Central tooth of mentum large, with 9–10 teeth on either side. Lateral hairs of *thorax* moderately developed; pleural hairs on meso- and metathorax arise from tubercles furnished with a curved spine and a few smaller straight spines. A number of hairs with few short, fine branches on thorax and abdomen, not developed as obvious stellate hairs, as in *A.* (*F.*) *suffusus*. Larger lateral hairs on *abdomen* 2–3-branched. Comb of 8–12 large pointed teeth in a single row. Subsiphonal tuft with 6–8 branches.

Fig. 44.



♂ hypopygial details (base of coxite from inside, middle of 9th tergite) of *Aëdes* (*Finlaya*) *niveus* and related species: **a**, **b**, *alboniveus*; **c**, **d**, *novoniveus*; **e**, **f**, *niveoides*; **g**, **h**, **i**, **l**, *albolateralis*; **j**, **k**, *niveus*. (**h**, whole coxite, showing scales; **l**, harpago.)

Siphon slightly wider in middle than at either end, 3–3½ times length of diameter at base. Acus very small and apparently detached, and lying separately in some specimens. Pecten of 15–24 rather small teeth, with one large and one or two small lateral denticles; pecten confined to basal ½ of tube. Hair-tuft at about middle of tube, with 4–6 branches. Saddle almost enclosing *anal segment*, some spines on posterior margin towards dorsum; *lh* usually of 2 long branches, occasionally single, more rarely of 3–6 branches; *isc* of 3–4 branches. Fan of about 8 hairs, two or three of which arise from membrane towards base of segment, each hair divided into 2–4 branches; fan-plate small. Dorsal papillæ about twice length of ventral pair and about length of longer fan-hairs.

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION *.—ASSAM: Golaghat, Sibsagar dist., v. 1925 (*Barraud*); Haflong, Cachar Hills, viii. 1922 (*Barraud*); Nongpoh, Khasi Hills dist., vii. 1922 (*Barraud*). E. BENGAL: Rangamati, Chittagong Hill Tracts, ix. 1922 (*Barraud*). N. BENGAL: Sukna, Darjeeling dist., ix. 1922 (*Barraud*); Kurseong, Darjeeling dist., viii. 1928 (*Sobha Ram*); Meenglas, near Jalpaiguri, Duars, v. 1923 (*M. O. T. Iyengar*). W. HIMALAYAS, 4–8,000′: Simla, ix. 1924 (*Barraud*); Solan, viii. 1923 (*Barraud*); Krol Mt., near Solan, vii. 1930 (*Barraud*); Kasauli, vii.–viii. 1924 (*Barraud*); Koti, near Kalka, viii. 1923 (*Barraud*). N. KANARA: Karwar, ix. 1921 (*Barraud*).

101. **Aëdes (Finlaya) niveus** (Ludlow), 1903 †.

Journ. N.Y. Ent. Soc. xi, p. 139 *b* (*Stegomyia*) (♀). TYPE-LOC.: Oras, Samar, Philippine Is. TYPE: ♀ in Brit. Mus.; other ♀♀ (paratypes or cotypes) in U.S. Nat. Mus.

Stegomyia pseudonivea Theobald, 1910 (♂ only), M.C. v, p. 176. TYPE-LOC.: Andaman Is. (*Lowis*). ALLOTYPE: ♂ in Brit. Mus. [Type ♀ from Singapore is a different species.]

ADULT ♀.—Appears to differ slightly from *albolateralis* in having a rather larger white area on front of mesonotum, this white area solid, as in the ♂, its posterior border not or scarcely emarginate. Scutellar scales all black.

♂.—[Scales on dorsum of head black, with a narrow silvery margin to eyes (in all 6 ♂♂ examined). Scutellar scales black. Scales on posterior ⅓ of mesonotum mostly black, no white ones over wing-base and few or none surrounding antescutellar bare space. Abdominal tergites II–IV unbanded.] *Hypopygium* (fig. 44, **j**, **k**): coxite without a group of scales at base of dorsal border, but with some long hairs in this position. 9*t* with a pair of prominent submedian processes (close together), each with 4–5 strong hairs. Style with appendage rather more than ½ its length.

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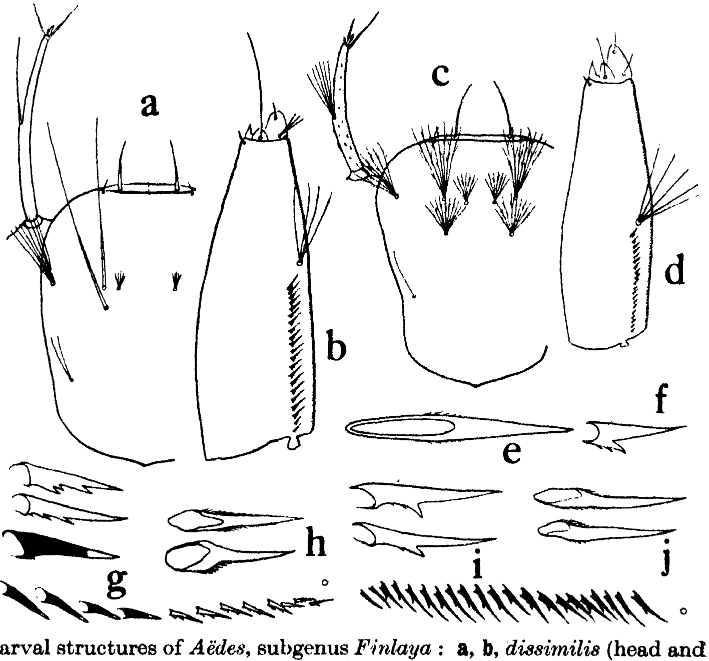
* As checked by Author by examination of ♂♂.

† As restricted by Brug 1931 *b*, p. 25; it is not known with certainty whether this was the form described by Ludlow. See also Edwards 1913 *b*, p. 227, and 1921 *c*, p. 318; Borel, 1928 *b*, pp. 43–45.

LARVA.—This has not been isolated in India. Dr. Brug has kindly furnished me with a translation from the German of his remarks on this larva *, as found by him in the Dutch East Indies :—" Under the name *F. nivea*, Borel (1928) has described the larva of var. *B*. That of the type is distinguished from the latter in the following respects :—Scales of the comb on the 8th segment more in number and more hairy, the number of scales being 16–19, as against 8–10 in the var. *B*

Fig. 45.



Larval structures of *Aëdes*, subgenus *Finlaya* : **a**, **b**, *dissimilis* (head and siphon) ; **c**–**f**, *albolateralis* (head, siphon, comb, and pecten-teeth) ; **g**, **h**, *novoniveus* (pecten and comb-teeth enlarged and whole pecten) ; **i**, **j**, *alboniveus* (ditto).

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* Brug 1931 *b*, p. 25.

larva; the siphon is much shorter (index 2½, in var. *B* larva 5); the teeth of the pecten are sharper, and, but for the tips, darker than in var. *B*."

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION.—SOUTH BENGAL, Cassiabad *, Sundarbans (*M. O. T. Iyengar*). ANDAMAN ISLANDS *, vii. 1926 (*Covell*).

Brug has recorded the type-form from SUMATRA, BALI, SINGAPORE, ANDAMAN IS., ? PHILIPPINE IS., and JAPAN.

102. **Aëdes (Finlaya) alboniveus**, sp. n.

TYPE-LOC.: Kurseong, Darjeeling dist., E. Himalayas, ix. 1922 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT ♀.—Not distinguished from *A.* (*F.*) *niveus*. White patch on mesonotum complete, as in ♂.

♂.—[Scales of head creamy. Most of the scales above wing-base, as well as a large number round antescutellar bare space, white. Scutellar scales creamy or pale brown. Abdominal tergites II–IV without complete basal pale bands.] *Hypopygium* (fig. 44, **a**, **b**): 9*t* with a pair of small submedian lobes, much smaller than in the type-form, and rather more separated than in *albolateralis*, each lobe with 1–3 hairs. Some long hairs at base of coxite, and a ridge carrying an elbowed process and a stout hair (this character distinguishes this form from all others). Appendage of style long, about ⅘ length of style.

LARVA (fig. 45, **i**, **j**).—One incomplete skin, from which a ♀ resulted, shows the following characters:—Antenna long and tapering, shaft with very strong spicules, tuft well *before* middle. Comb of about 12 long teeth, with lateral fringes for about ½ the length (in *niveus* the teeth are fringed from near base to tip, the number of teeth being usually 16–19; in *niveoides* they are delicately fringed at base only, the number being usually 8–10). Siphon about 1 mm. long, not including valves (in *albolateralis* it is usually about 0·7–0·8 mm.). Pecten of 21 teeth, individual teeth about ¾ length of comb-teeth; basal teeth small; each tooth with one lateral denticle about half-way along its length. Thorax and abdomen with a number of hairs with short branches of stellate form, and long lateral subplumose hairs.

Further material is required before a complete description can be given.

HABITAT.—Tree-holes and bamboos.

DISTRIBUTION.—Known only from the type-locality.

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* ♂♂ examined by author.

103. **Aëdes (Finlaya) niveoides,** sp. n.†

TYPE-LOC. : Nagargali, Bombay Deccan, viii. 1921 (*Barraud*). TYPE : ♂ in Brit. Mus.

ADULT.—Does not show any external difference from *A.* (*F.*) *niveus.*

♂.—*Hypopygium* (fig. 44, **a**, **f**) : 9*t* with a pair of submedian, rather flat lobes, each bearing only 2–3 hairs. A small boss-like lobe at base of coxite from which a collection of very long hairs arises ; also a ridge carrying 6–7 strong hairs, but no processes as in *alboniveus.* Style with terminal appendage approximately ⅔ its length.

LARVA.—Has not been isolated in India. Borel has described a larva from Cochin China which Brug has determined as that of his var. *B.* This var. appears to me to be probably identical with the form here described as *niveoides.* Some notes on the larva are given above under *A.* (*F.*) *niveus.*

HABITAT.—Bamboos.

DISTRIBUTION.—INDIA : Nagargali (type-locality as above) ; one ♂ which corresponds closely in hypopygial structure, from Meenglas *, Jalpaiguri, Bengal Duars, ix. 1926 (*B. M. Khan*, per *M. O. T. Iyengar*).

Brug records his var. *B* from INDO-CHINA, SUMATRA, and JAVA.

104. **Aëdes (Finlaya) novoniveus,** sp. n.

TYPE-LOC. : Mungpoo, Darjeeling dist., E. Himalayas, x. 1922 (*Barraud*). TYPE : ♂ in Brit. Mus.

ADULT ♀.—Not distinguished from *A.* (*F.*) *niveus.* White area on mesonotum complete, as in ♂.

♂.—[Scales of head and scutellum all creamy. Many white scales above wing-base and around bare antescutellar space. Complete basal white bands on tergites II–IV evident except in shrunken specimens ‡.] *Hypopygium* (fig. 44, **c**, **d**) : 9*t* with moderate-sized, rounded, submedian lobes, each carrying 4–5 hairs. Coxite without a conspicuous collection of long hairs or scales at base, but a ridge carrying some fairly fine hairs, a few of these rather long. Harpago expanded fairly near the base, not gradually widening to the middle, as in other forms. Style with terminal appendage slightly more than ½ its length.

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† Apparently *A.* (*F.*) *niveus* var. *B* of Brug (1931 *b*, p. 25). See also Borel 1928, pp. 43–45.

‡ [2 ♂♂ in British Museum from Malaya (*Leicester* & *Stanton*) agree with the type ♂ in these respects, as well as in hypopygium.]

LARVA (fig. 45, g, h).—One isolated larval skin, from which a ♀ resulted, is thought to be most probably of this form, as it was obtained from Mungpoo, Darjeeling dist., at the same time as the type ♂. It differs from all other described larvæ of this group in having the 4–5 pecten-teeth nearest base of siphon without lateral denticles, and larger than the more distal teeth, which have denticles. Antennæ shorter than in *albolateralis* or *alboniveus*, spicules on shaft inconspicuous. In other respects the larva resembles *albolateralis* fairly closely. Comb of 8 large sharp teeth in a single row; *isc* of 4 fairly long branches †.

HABITAT.—Bamboo-stumps and tree-holes.

DISTRIBUTION.—E. HIMALAYAS: Mungpoo * (type-locality, as above); Sureil *, near Mungpoo, Darjeeling dist., x. 1922 (*Barraud*); Kurseong *, Darjeeling dist., ix. 1922 (*Barraud*). ASSAM: Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*).

Subgenus **CHRISTOPHERSIOMYIA** Barraud, 1923.

Ind. Journ. Med. Res. x, p. 786. Genotype, *Stegomyia thomsoni* Theo.

ADULT ‡.—Black and white ornate mosquitoes, resembling *Stegomyia*, but having a pale band on proboscis and palpi about $\frac{1}{4}$ length of proboscis in both sexes. Scales on vertex of head and on scutellum all flat, but those on *apn* narrow. Plumose hairs on antennæ of ♂ projecting mainly dorsally and ventrally, not in regular whorls. Phallosome of ♂ hypopygium scoop-shaped, not divided into lateral plates, and without teeth. Coxite with small lobe on inner surface. Style simple, slightly tapering, with terminal appendage. Paraproct without lateral arm, no teeth or small hairs at crown.

LARVA (4th stage).—Very similar to *Stegomyia*, but antenna longer and with spicular shaft, and with branched hair at about middle.

DISTRIBUTION and BIONOMICS.—The three known species are confined to India and Ceylon, only one of these being at all common. The larvæ are found in tree-holes during the monsoon periods.

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† [In this specimen the antennal hair-tuft is about at middle of shaft and the pecten has about 12 teeth. A drawing made by Mr. A. J. E. Terzi of a larval skin (from which a ♀ hatched), obtained in Malaya by Dr. A. T. Stanton in 1915, shows large, simple, basal pecten-teeth as in the above specimen, but the antennal tuft is far *beyond* the middle and only 8 pecten-teeth are present.]

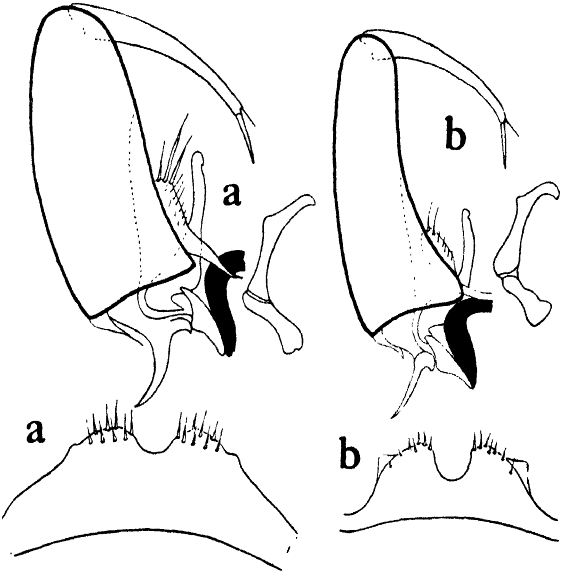
* ♂♂ examined by author.

‡ Edwards 1932, p. 159.

Key to Adults.

1.	Hind tibia with a white ring on basal ½....	*thomsoni*, p. 213.
	Hind tibia without a white ring on basal ½.	2.
2.	Fore femur dark, except for a white mark near base on posterior surface (beneath)..	*annulirostris*, p. 215.
	Fore femur with a white mark on apical ½ of anterior surface, connected with a white streak on posterior surface........	*ibis*, p. 215.

Fig. 46.



♂ hypopygial structure of *Aëdes*, subgenus *Christophersiomyia* : **a**, *thomsoni* ; **b**, *annulirostris*.

105. Aëdes (Christophersiomyia) thomsoni (Theobald), 1905 *.

Gen. Ins., Fam. Culicidæ, p. 18 (*Stegomyia*) (♀). TYPE-LOC.: N.W. Provinces, India (*Wyville-Thomson*). TYPE : ♀ in Brit. Mus.

ADULT (Pl. VI, figs. 12, 16, and Pl. VIII, fig. 1).—Wing 2·5–3·5 mm. Distinguished from the two other species on characters given in key. Mesonotum ornamented with silvery-white and pale brown scaling, and with a pair of brownish eye-like spots in front. Amount of pale brown scaling on posterior part of mesonotum variable. All lobes of scutellum with flat white scales. Palpi about ¼ length of proboscis in both sexes, latter with a fairly wide white ring.

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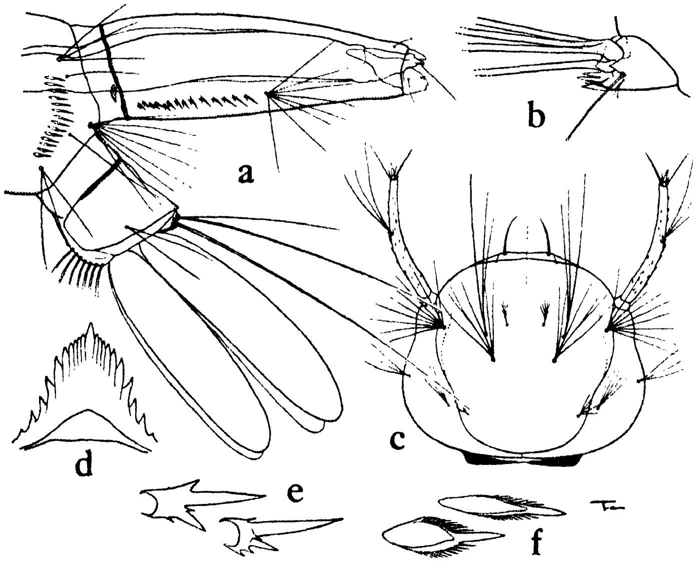
* Theobald 1907, p. 174 ; Barraud 1923 *a*, p. 787.

♂.—*Hypopygium* (fig. 46, **a**): see remarks under subgenus above.

Larva * (fig. 47).—Body creamy or white, contrasting with dark head and siphon. *Frontal hairs A*, *B*, and *C* all fairly long and branched: *A* with about 10 branches; *B* usually with 2, one of these thicker and longer than the other; *C* with about 8; *d* small, with few fine branches, and internal to other three pairs. All four pairs are a little posterior to level of bases of antennæ. Preclypeal spines long, slender, tapering to a fine point. Hairs of mouth-brushes simple. Antenna fairly long, shaft with small spicules; tuft of 2–3 hairs at about middle. Mentum rather pointed, triangular, about 11 teeth either side of central one, basal teeth large, four or five nearest apex much smaller. Hairs on *thorax* and *abdomen* moderately developed, no special structures present. Comb of about 14 strong, pointed teeth in one close-set rank; teeth with delicate fringe from base, almost to tip. *Siphon* 3½–4 times length of diameter at base, widest in middle. Acus very small or absent. Pecten

Fig. 47.



Larval structures of *Aëdes* (*Christophersiomyia*) *thomsoni*: **a**, tail-end; **b**, base of metathoracic pleural hairs; **c**, head; **d**, mentum; **e**, **f**, pecten and comb-teeth.

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* Barraud 1923 *h*, p. 503.

of about 16 small teeth, each with 2–3 basal lateral denticles; hair-tuft of 6–8 branches, at about middle of tube. *Anal segment* almost enclosed in chitinisation; some very small spines scattered over surface towards dorsum; *isc* of 2 branches; *osc* single and long; *lh* of 4–5 fine branches. Dorsal papillæ about 3 times length of segment, ventral pair shorter. Fan small, longest hairs only about ½ length of dorsal papillæ.

HABITAT.—Tree-holes.

DISTRIBUTION.—A common monsoon species occurring from N.W. FRONTIER as far east as BIHAR (Pusa) and southwards to MADRAS. So far as is known it is absent from Assam, Burma, and Ceylon, and it has not been recorded from beyond limits of Indian region.

106. **Aëdes (Christophersiomyia) annulirostris** (Theobald), 1905.

Journ. Bomb. Nat. Hist. Soc. xvi, p. 239 (*Stegomyia*) (♀) TYPE-LOC.: Peradeniya, Ceylon, i. 1902 (*Green*). TYPE: ♀ in Brit. Mus.

ADULT † (Pl. VI, fig. 11, and Pl. VIII, fig. 1).—Very similar *A.* (*C.*) *thomsoni* and *ibis*, but differs as indicated in key.

♂.—*Hypopygium* (fig. 46, **b**): does not show any marked difference from that of *thomsoni*.

LARVA.—Known only from one incomplete larval skin; very similar to *thomsoni*, but further material is required before a description can be given.

HABITAT.—Tree-holes and water-butts.

DISTRIBUTION.—BOMBAY DECCAN: Belgaum * and Nagargali *, viii. 1921 (*Barraud*). N. KANARA: Karwar *, bred ii. 1931 (from tree-hole material supplied by *T. R. Bell*). CEYLON: type-locality, as above; Labugama, i. 1933 (*Henry*).

107. **Aëdes (Christophersiomyia) ibis** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 610 (♀). TYPE-LOC.: Sukna, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). TYPE: ♀ in Brit. Mus.

ADULT ♀.—In general appearance and character of scaling resembles *A.* (*C.*) *annulirostris*, but differs as indicated in key, also in having no lateral dark areas on mesonotum in front of wing-roots.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

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† Theobald 1907, p. 173; Barraud 1923 *a*, p. 788.

Subgenus **RHINOSKUSEA** Edwards, 1929 *.

Bull. Ent. Res. xx, p. 342. Genotype, *Ficalbia longirostris* Leic.
Ficalbia Leicester, 1908 (nec Theobald), Cul. Malaya, p. 228.

The subgenus includes only one species, the characters of which are given below. The larvæ live in crab-holes and pools in mangrove-swamps. Nothing is known of the habits of the adult.

108. **Aëdes (Rhinoskusea) longirostris** (Leicester), 1908.

Cul. Malaya, p. 228 (*Ficalbia*) (♂ & ♀). TYPE-LOC.: Kuala Klang, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—A small, slender, brownish-black mosquito, without any ornamentation. Wing 2–2·7 mm.

♀.—*Head*: mainly flat-scaled. Palpi quite short, projecting only slightly in front of clypeus. Proboscis long and slender, as long as whole body. Scutellum flat-scaled. All tarsal claws simple. Legs unusually long; segment 1 of hind tarsi slightly longer than tibia (a character distinguishing this mosquito from all others of the genus *Aëdes*). Cerci rather long.

♂.—Resembles the ♀ in all details except structure of hypopygium and antennæ, latter only moderately plumose, hairs evenly spread round shaft. *Hypopygium* (fig. 48): remarkably distinct from that of any other species. Coxite rather narrow, with a hairy lobe near apex, and two large processes arising from inner surface. Style fairly long, hairy on apical $\frac{1}{3}$, and with a small double appendage. Paraprocts with about 5 small hairs near crown. Phallosome simple, not toothed nor divided into lateral plates.

LARVA.—Described by Edwards (1926 *a*, p. 120) from Singapore specimens as follows :—

" Head very broad and rather light in colour. Antennæ long, curved, and tapering, surface with numerous spicules, especially towards the base; tuft of 3 or 4 long hairs placed a little before the middle; a long fine hair near the tip. Frontal hairs placed close together and far back, the arrangement being practically the same as in *Aëdes cinereus* Mg.; the three main pairs of tufts very long, consisting respectively of 10–12, 2, and 6–7 hairs. Mentum with about 12–14 teeth on each side of the stronger median tooth. Abdominal hairs inconspicuous. Comb consisting of about 40 small narrow bare teeth in a patch. Anal segment with small saddle which is covered with small spicules; lateral hair single and rather long; about 8 tufts in the brush, none before it. Siphon not very dark; index about 3·5; well-developed acus at base; pecten just beyond the middle, with about 12 spines, none detached; tuft of 3 very long hairs, placed far beyond the pecten and only a little before the tip of the siphon. Valves normal."

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* Edwards 1932, p. 160.

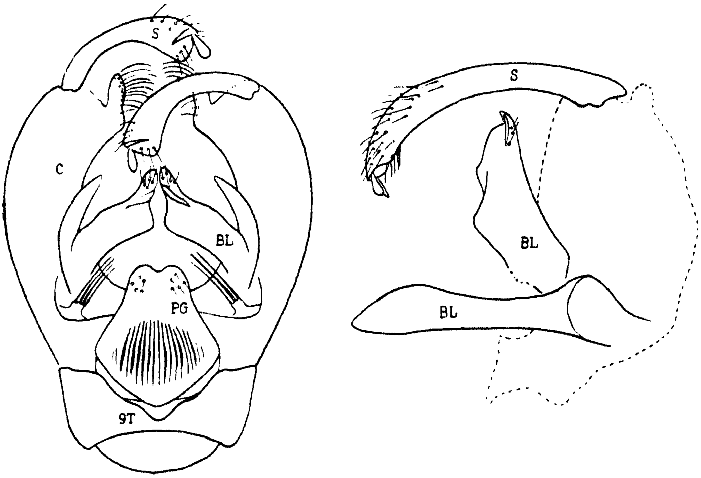
† Edwards 1917, p. 224, and 1924, p. 391; Barraud 1928 *b*, p. 363.

HABITAT.—Pools in mangrove-swamps; crab-holes.

DISTRIBUTION.—ANDAMAN Is. *, caught in crab-hole, Port Mouat, ix. 1911 (*Christophers*); vii. 1926 (*Sobha Ram*).

Known also from MALAY PENINSULA and ARCHIPELAGO and NORTH AUSTRALIA.

Fig. 48.



♂ hypopygium of *Aëdes* (*Rhinoskusea*) *longirostris* Leic., ventral and lateral view. Lettering as on p. 4.

Subgenus **STEGOMYIA** Theobald, 1901.

M.C. i, p. 283. Genotype, *Culex fasciatus* Fab.

Scutomyia Theobald, 1904, Entom. xxxvii, p. 77. Genotype, *S. albolineata* Theo.

Quasistegomyia Theobald, 1906, 2nd Rept. Wellc. Lab. p. 69. Genotype, *Q. unilineata* Theo.

Catatassomyia Dyar & Shannon, 1925, Insec. Ins. Mens. xiii, p. 71. Genotype, *C. meronephada* D. & S.

ADULT †.—Small or medium-sized black or dark mosquitoes, highly ornamented with patches, spots, or lines of snow-white scales. Two or more basal white bands on tarsi of at least one pair of legs, or with one or more tarsal segments completely white (*vide* Pls. VII & VIII). Tarsi in no case all completely dark nor with apical and basal banding.

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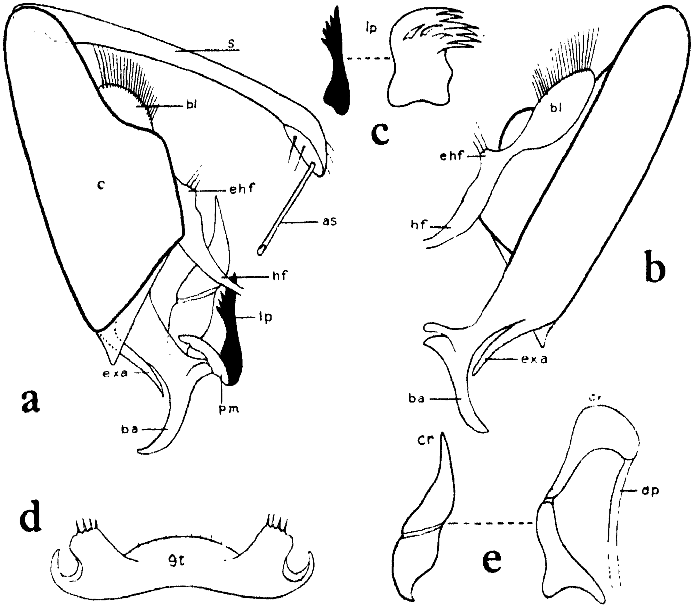
† Edwards 1932, p. 160.

Proboscis entirely dark (except in the aberrant species *A.* (*S.*) *vittatus*, in which there is some yellow scaling on that organ). Scales on vertex and scutellum broad and flat; a few upright scales on nape (more numerous in *A.* (*S.*) *vittatus*, where they extend forwards for some distance). Palpi of ♂ rather slender, terminal segments upturned and with only few hairs. Antennæ of ♂ with plume-hairs mainly projecting on two sides, not in regular whorls. ♂ *hypopygium*: coxite with plaque or lobe on inner surface bearing hairs or processes of diagnostic importance; form of 9th tergite also characteristic in many species; style usually, though not always, rather long, with straight tube-like appendage near tip. Harpago absent. Paraprocts without teeth or small hairs at crown, and, except in *A.* (*S.*) *ægypti* and *desmotes*, without a ventral or basal arm. Phallosome divided into small lateral plates with numerous teeth. ♀ *hypopygium*: cerci quite short, segment VIII partially retractile, sternite of only moderate size. The above-mentioned characters

Fig. 49.



♂ hypopygial structures of *Aëdes* (*Stegomyia*) *w-albus* Theo.: **a**, hypopygium, from above, 9th tergite removed; **b**, coxite from beneath; **c**, lateral plate of phallosome from above and from side; **d**, 9th tergite; **e**, paraproct, from above and from side. Lettering as on p. 4.

distinguish *Stegomyia* from certain species of the subgenus *Finlaya* and genus *Armigeres*, which have a rather similar black-and-white ornamentation. In the species last referred to the tarsi are either entirely dark or with apical and basal banding, or with only one basal band. In some of these species, also, there is a pale band or extensive pale scaling on the proboscis.

LARVA (4th stage).—Antennal shaft tooth, with usually a single hair in place of tuft. Frontal hairs *B* and *C* usually one in front of the other. Thorax without large spines on dorsum, but stellate hairs often present, as well as on abdomen. Comb-teeth in a single row, in some species few and arising from posterior margin of chitinised plate. Siphon 1–3 times length of diameter at base. No acus. Pecten well developed, teeth in regular rank, and all about same size, no detached teeth (except in *A.* (*S.*) *vittatus*, in which there is a detached tooth beyond the hair-tuft) ; siphon-tube with one pair of hair-tufts at about middle, or between this and apex. Chitinised saddle of anal segment usually rather small ; anal fan often small also.

DISTRIBUTION and BIONOMICS.—The subgenus is represented in all parts of India, some species being very common. Many are day-flying insects, and readily attack man. *A.* (*S.*) *ægypti* (*Stegomyia fasciata*) is the well-known yellow-fever mosquito, and the Indian race has been proved capable of transmitting this disease. It is considered to be the carrier of dengue fever. It is almost entirely a house-frequenting species, breeding in artificial collections of water. The literature dealing with the bionomics of this and other species of the subgenus, in connection with disease, is extensive, and references will be found in the 'Tropical Diseases Bulletin.' Other species breed extensively in tree-holes and bamboo-stumps, some occurring up to 8,000′ or more in the Himalayas. The eggs are laid singly and are capable of resisting desiccation over long periods.

About 44 species are known, of which 16 have been found in India, the remainder occurring either in Africa or the eastern part of the Oriental region, some extending to Australia and the Pacific islands. *A.* (*S.*) *ægypti* is found throughout the tropics and subtropics of the world.

Key to Adults.

1.	All tibiæ with white rings	2.
	Tibiæ without white rings	3.
2.	Mesonotum marked with 4–6 small white spots ; femora with preapical white rings; proboscis with scattered yellow scaling..	*vittatus*, p. 245.
	Mesonotum otherwise marked ; femora without preapical white rings ; proboscis entirely dark	*desmotes*, p. 225.

3.	Mesonotum marked with a pair of lateral curved white lines, and usually also with a pair of submedian yellowish lines; two dots of white scales on clypeus	*ægypti*, p. 221.
	Mesonotum otherwise marked; clypeus without white scales	4.
4.	Palpi entirely dark; proboscis thin and longer than fore femur; mesonotum with a fairly narrow, silvery, median stripe in front; last two hind tarsal segments all dark	*albolineatus*, p. 243.
	Palpi with white scaling; proboscis normally thick and about length of fore femur	5.
5.	Mesonotum with a narrow median white line running nearly the whole length	6.
	Mesonotum with a broad white anterior stripe, or with a white patch or pair of patches in front	10.
6.	Mid-femur with a preapical white spot on anterior surface	*unilineatus*, p. 242.
	Mid-femur without a white spot	7.
7.	White scales on pleuræ arranged more or less in two lines; a line of white flat scales over wing-root continued nearly to lateral lobe of scutellum	*scutellaris*, p. 240.
	White scales on pleuræ arranged in irregular patches; a patch of white scales in front of wing-root only	8.
8.	Pale markings on mesonotum, except for the median white stripe, of a yellowish colour	*flavopictus*, p. 239.
	Pale markings on mesonotum all silvery white	9.
9.	Abdomen without silvery bands on dorsum (? always)	*subalbopictus*, ♂, p. 238.
	Abdomen with silvery basal bands on dorsum	*albopictus*, p. 233; *pseudalbopictus*, p. 235; *novalbopictus*, p. 237.
10.	Mid-femur with a median white spot on anterior surface; mesonotum with several white patches	*w-albus*, p. 232.
	Mid-femur without a white spot	11.
11.	Mesonotum with a broad median white stripe, narrowing posteriorly	*mediopunctatus*, p. 230.
	Mesonotum with a roundish white area in front	12.
12.	Mesonotum with a small median white spot in front; all segments of hind tarsi white-ringed	*edwardsi*, p. 232.
	Mesonotum with a large median white patch in front; last one or two hind tarsal segments all dark	*annandalei*, p. 227; *craggi*, p. 229.

109. Aëdes (Stegomyia) ægypti (Linnæus), 1762.

Hasselquist's Reise nach Palestina, p. 470 (*Culex*) (♀ ?). TYPE-LOC.: Egypt. TYPE: non-existent.

SYNONYMY (abridged) *:—

Culex argenteus Poiret, 1787, Journ. Phys. xxx, p. 245 (♀). TYPE-LOC.: Barbary. TYPE: non-existent.

Culex fasciatus Fabricius, 1805, Syst. Antliat. p. 36 (♂ ?). TYPE-LOC.: West Indies ("Americae Insulis"). TYPE: non-existent (originally in Copenhagen Mus.).

Culex calopus Meigen, 1818, Syst. Beschr. i, p. 3 (♂♀). TYPE-LOC: Portugal. TYPE: non-existent (unless in Vienna Mus.).

var. *atritarsis* Edwards, 1920, Bull. Ent. Res. x, p. 129 (♂ & ♀). TYPE-LOC.: Accra, Gold Coast, W. Africa, vi. 1919 (*J.W.S. Macfie*). TYPE: ♂ & ♀ in Brit. Mus.

var. *luciensis* Theobald, 1901, M.C. i, p. 297 (♂ & ♀). TYPE-LOC.: Georgetown, Demerara, South America, vi. 1899 (*Quelch*). TYPE: ♂ & ♀ in Brit. Mus.

var. *queenslandensis* Theobald, 1901, M.C. i, p. 297 (♀). TYPE-LOC.: Burpengary, South Queensland, Australia, xi. (*Bancroft*). TYPE: ♀ in Brit. Mus.

ADULT.—Recognized by characteristic ornamentation as shown in Pl. VI, figs. 1, 13, and Pl. VII, fig. 1. The following details will assist in identification in cases where the mesonotum has become denuded (as very frequently occurs).

♀.—*Head*: silvery-white flat scales in middle of vertex, continued downwards between eyes; similar scales on tori; two small silvery-white dots on clypeus (white scales are not present in this position in any other species except *A.* (*S.*) *vittatus*); tips of palpi conspicuously white. *Thorax*: flat silvery-white scales on all lobes of scutellum. *Legs*: mid-femur, when viewed from the front, with a white longitudinal line running from the base for nearly whole length, but not continued quite to knee; anterior surface of hind femur pale on basal ½, or more, the pale scaling continued as a thin longitudinal line nearly to knee. Tarsi of fore and mid-legs with narrow basal white bands to first two or three segments, those of hind legs with more conspicuous white basal rings on segments 1–4, that on 4 being usually the widest, segment 5 usually entirely white. *Abdomen*: tergites brownish to black, with narrow dull white basal bands on II–VI, VII with two small silvery-white dots; lateral basal silvery-white patches on I–VII not usually visible in dorsal view.

♂.—Ornamentation similar to that of ♀. Palpi (Pl. VI, fig. 13) with two white rings on the long segment and with

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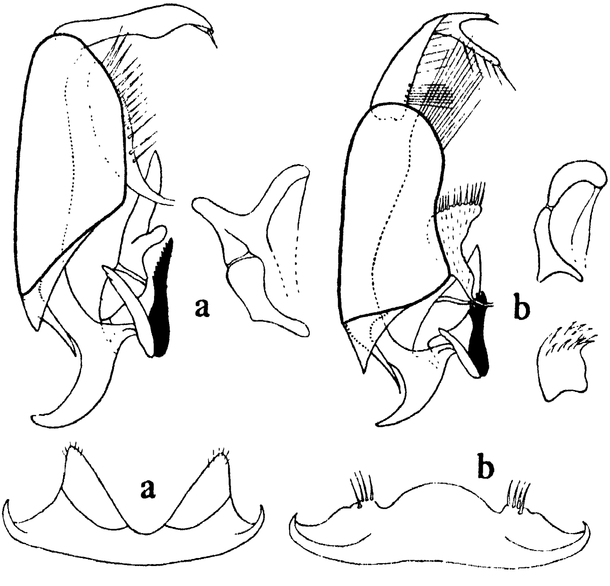
* For further synonymy and refs., *vide* Edwards 1932, p. 162. As regards India, *vide* Barraud 1928 *c*, pp. 377–388. For account of work on this species in other parts of the world, *vide* reviews in Trop. Dis. Bull. and Rev. Appl. Ent.; also Bonne-Wepster & Brug 1932, p. 47.

white marks on undersides of last two segments at base. *Hypopygium* (fig. 51, **a**): differs from all other species in shape of 9*t*. The paraproct has a well-developed ventral arm, an unusual feature, absent in all other Oriental species except *A.* (*S.*) *desmotes.*

var. *luciensis* Theo.—Differs from the type-form in having the apical part of segment 5 of hind tarsi black. Occasional specimens of this form are met with in India.

var. *queenslandensis* Theo.—In this form there are some dark purplish scales on mid-lobe of scutellum and, on the abdomen, both basal and apical bands of pale scales, and a broad, pale, median longitudinal line, or the whole dorsum may be almost entirely pale. Specimens resembling this var. have been received from Bangalore, South India.

Fig. 50.

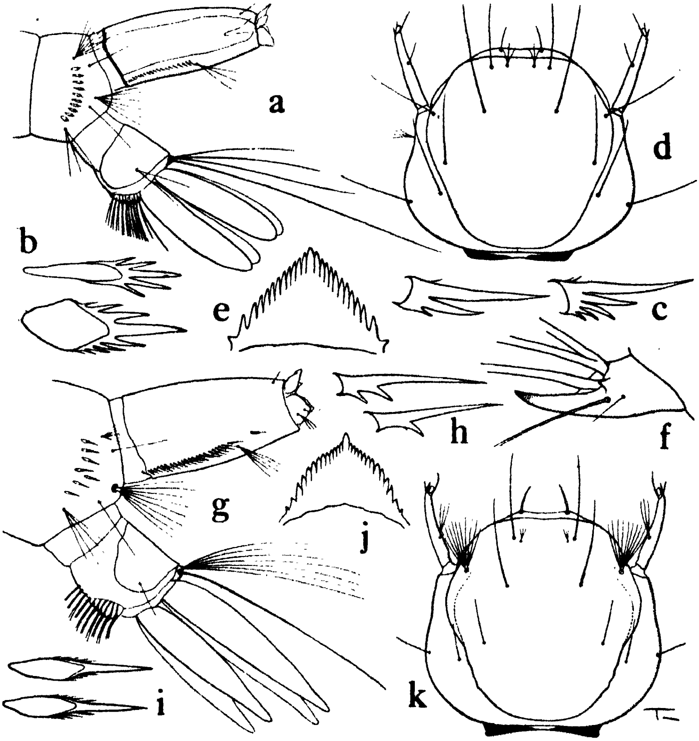


♂ hypopygial structures of *Aëdes* (*Stegomyia*): **a**, *ægypti*; **b**, *mediopunctatus*.

var. *atritarsis* Edw.—Tarsi of fore and mid-legs almost entirely black, only 2–3 white scales at bases of first two segments; hind tarsi black, with very narrow white rings at bases of segments 1–3 and 5. White rings on ♂ palpi narrower than usual. No Indian specimens of this var. are known.

Other Variations.—Connal (1927, p. 5) has described and figured some remarkable varieties of this species from Lagos, Nigeria, including the var. *atritarsis* referred to above. In some Indian specimens the scales on the middle of the mesonotum are much paler than usual, and the narrow submedian yellowish lines obliterated.

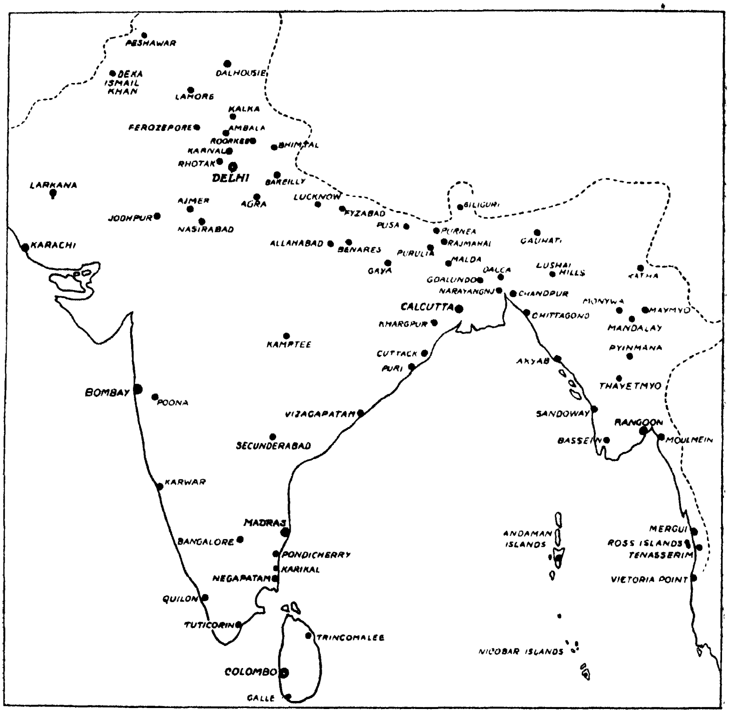
Fig. 51.



Larval structures of *Aëdes* (*Stegomyia*): **a–f**, *ægypti*; **g–k**, *vittatus*. **b**, **i**, comb-teeth; **c**, **h**, pecten-teeth; **f**, base of metathoracic pleural hairs.

Larva (fig. 52, **a–f**).—Distinguished from those of other species by the form of the 8–12 comb-teeth, which have well-developed lateral denticles; the teeth do not arise from a chitinised plate, as is the case in *A.* (*S.*) *desmotes* and some other species. Antennal hair single and attached a little nearer apex than base of shaft. Lateral hairs of *thorax* moderately developed; thorn-like process at bases of pleural hairs on meso- and metathorax comparatively large and ending in a single point. *Siphon* usually rather more than twice length of diameter at base; tuft of 3–5 branches, a little beyond middle of tube from base. Pecten of 12–20 teeth, with basal lateral denticles. *Anal segment* almost enclosed in chitinisation; *lh* single or 2-branched; *isc* of 2–4 branches. Papillæ with rounded extremities and about twice length of segment. Longest hairs of fan about twice length of papillæ.

Fig. 52.



Distribution in India of *Aëdes* (*Stegomyia*) *œgypti*, as at present known.

HABITAT.—Artificial collections of water near, or within, human habitations, such as chattis, water-butts, anti-formicas, disused kitchen utensils, etc. It is unusual to find larvæ in tree-holes or bamboo-stumps, or in natural ponds or wells.

DISTRIBUTION.—Generally distributed throughout the Indian region. The names of places where the species has been found are shown on the accompanying map.

110. **Aëdes (Stegomyia) desmotes** Giles, 1904.

Journ. Trop. Med. vii, p. 367 (♀). TYPE-LOC.: Philippine Is. TYPE: ♀ in Brit. Mus.

Stegomyia gracilis Leicester, 1908, Cul. Malaya, p. 81 (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Stegomyia albipes Theobald, 1910, Rec. Ind. Mus. iv, p. 11 (♀). TYPE-LOC.: Maddathoray, Travancore, xi. 1908 (*Annandale*). TYPE: ♀ in Ind. Mus.

Anisocheleomyia ? albitarsis Ludlow, 1905, Can. Ent. xxxvii, p. 131 (♀). TYPE-LOC.: Pampanga, Luzon, Philippine Is. TYPE: ♀ in U.S. Nat. Mus.

ADULT *.—Recognized by thoracic markings and white rings on tibiæ †. Wing 2·5–3 mm.

♀.—*Head*: a broad area of flat white scales on vertex from back to front; bordered on either side with flat black scales, this dark area divided from another lateral dark area by a narrow band of white scales, lower down at side there is another patch of white scales. A narrow line of white scales between eyes; white scales on tori and at tips of palpi. Clypeus and proboscis black. *Thorax*: black, with white narrow scales on front margin of mesonotum; a pair of narrow submedian lines of white scales from front, continued back about half-way to level of wing-roots. A large patch of white scales over wing-root, continued forwards more narrowly along lateral margin of mesonotum. Three short longitudinal white lines between wing-roots. Flat white scales on all scutellar lobes. *Wings*: dark scaled. *Legs*: fore femur black, with a thin white line beneath; two white spots on mid-femur, one oblong near base, one rounder nearer tip, posterior surface black, but white at base and knee; hind femur white on about basal ½, white scaling continued on outer side towards knee, a subapical black ring, wider dorsally than ventrally, a white streak on outer side at apex, including knee. Tibiæ black, all with a white ring near middle. Tarsi of fore and mid-legs black, with narrow basal white rings to first two segments; wider basal white rings to segments 1–3 of hind tarsi, 4 and 5 entirely white. *Abdomen*: black, with narrow basal white bands on dorsum and large lateral white patches on I–VI; VII with small lateral white dot. Sternite black, with basal white bands.

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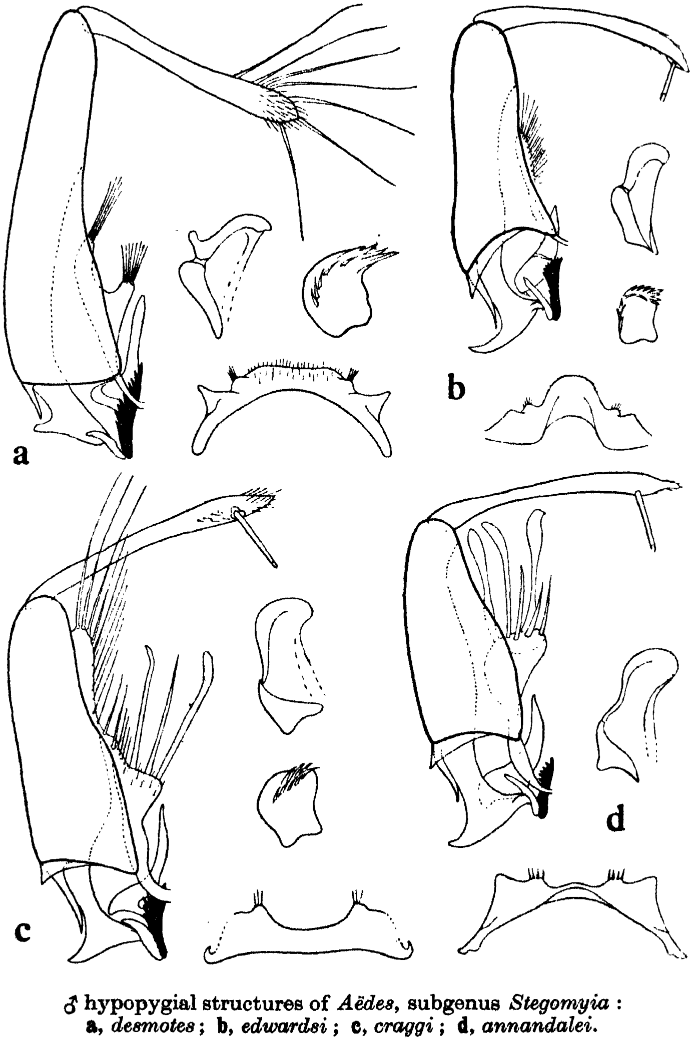
* Edwards 1913*b*, p. 225, and 1922 *d*, p. 464 (syn.); Barraud 1923*a*, p. 778, and 1923*f*, p. 224; Dyar & Shannon 1925, p. 74; Borel 1928 *a*, p. 80; Bonne-Wepster & Brug 1932, p. 102.

† [*A.* (*S.*) *chemulpoensis* Yamada, of Japan and China, has white rings on tibiæ, but thoracic markings quite different from *desmotes* (more suggestive of *ægypti*) and several silvery marks on anterior surface of middle femora.]

♂.—Palpi about length of proboscis, with four white rings, the second from base being widest. Markings as in ♀. *Hypopygium* (fig. 53, **a**): 9*t* flat in middle, with small sub-median hairy lobes; style with long hairs at apex but no distinct appendage; *bl* with two hairy lobes, one developed from *ehf*; paraproct with small ventral arm.

Fig. 53.



♂ hypopygial structures of *Aëdes*, subgenus *Stegomyia*: **a**, *desmotes*; **b**, *edwardsi*; **c**, *craggi*; **d**, *annandalei*.

LARVA †.—Not yet found in India; the following details are taken from Borel's account:—Antennal hair short, single, arising rather nearer apex than base of shaft. Comb of 3 teeth, with lateral basal denticles (as in *ægypti*), these teeth originating from a semicircular chitinised plate. Siphon short, very little longer than diameter at base, tuft of 3 branches, arising rather nearer apex than base; pecten of only 2 small fringed teeth. Both *isc* and *osc* single; *lh* short, 2-branched; fan of about 6 hairs of varying lengths; papillæ about as long as fan-hairs, pointed at apices.

HABITAT.—Bamboos.

DISTRIBUTION.—ASSAM: Golaghat *, Sibsagar dist., iv. 1925 (*Barraud*). BIHAR: Pusa *, 1913 (*C. S. S.*). BENGAL: Sukna *, Darjeeling dist., viii. 1928 (*Sobha Ram*). SOUTH INDIA: Ootacamund *, Nilgiri Hills, xi. 1915 (*Khazan Chand*); Kadra *, N. Kanara, ix. 1921 (*Barraud*); Travancore, type-locality *, as above.

Known also from MALAYA, COCHIN CHINA, PHILIPPINE IS., BORNEO, and SUMBA.

111. **Aëdes (Stegomyia) annandalei** Theobald, 1910.

Rec. Ind. Mus. iv. p. 10 (♀). TYPE-LOC.: Sukna, Darjeeling dist., 500′, vii. 1908 (*Annandale*). TYPE: ♀ in Ind. Mus.

var. *quadricinctus* Barraud, 1923, Ind. Journ. Med. Res. xi, p. 227 (♀). TYPE-LOC.: Nongpoh, Khasi Hills dist., Assam, vii. 1922 (*Barraud*) (*vide* below). TYPE: ♀ in Brit. Mus.

ADULT ‡.—Ornamentation § shown in Pl. VI, fig. 9, and Pl. VIII, fig. 5.

♀.—A large roundish patch of broad white scales in front of each wing-root. Scutellar scales white on lateral lobes, black on mid-lobe. *Legs*: fore femur black, with pale scaling beneath at base, mid-femur black, with white knee-spot (no white spot in middle), hind femur white on more than basal ½ and with a white knee-spot. Tibiæ black. Tarsi of fore leg black, with narrow basal white ring to segment 1, sometimes some white scales at base of 2; white basal rings to segments 1 and 2 on mid-leg; wider basal white rings to segments 1 and 2 on hind leg, 3 and 5 black, 4 nearly all white. *Abdomen*: dorsum black, with narrow basal white bands to II–VII, widening out considerably at sides. Sternites with basal white bands.

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† Borel 1928 *a*, p. 82; Bonne-Wepster & Brug 1932, p. 103.

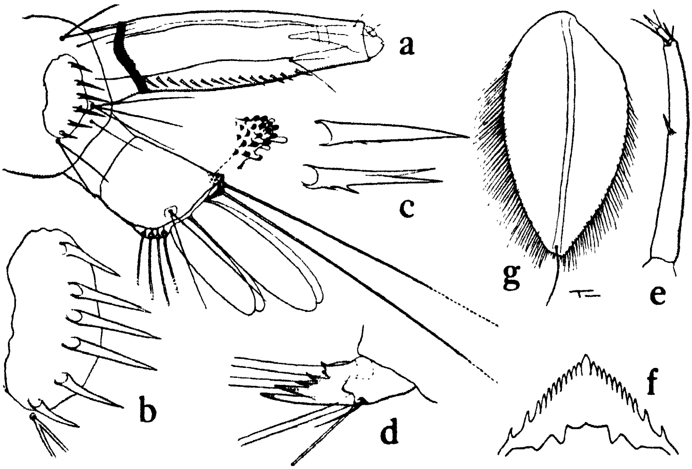
‡ Theobald 1910 *b*, p. 139 (*Kingia*); Barraud 1923 *a*, p. 781, and 1923 *f*, p. 226; Borel 1928 *a*, p. 95; Brug 1931 *b*, p. 22; Bonne-Wepster & Brug 1932, p. 98.

§ [*A.* (*S.*) *horishensis* Yamada, described from ♀ only from Formosa, is extremely similar to *annandalei*, differing in having white bands of abdominal tergites subbasal instead of basal in position.]

♂.—Palpi slightly longer than proboscis, with four white markings, second from base widest and most conspicuous. Markings of hind tarsi variable *. In 27 ♂♂ examined, segment 4 of hind tarsi (which is nearly all white in ♀) is white on basal ½ or more, at least dorsally, in 19 specimens ; in five others the base of this segment is only faintly or narrowly pale, and in three others it appears dark, as in *A*. (*S.*) *craggi*. *Hypopygium* (fig. 53, **d**) : style with a fairly long appendage attached some little distance from tip ; *bl* with three long clubbed processes, and shorter thick hairs.

var. *quadricinctus*.—Differs from the type-form in having basal white markings to first four tarsal segments on all legs ; markings at base of segments 3 and 4 on fore and mid-legs small and not forming complete rings ; complete white rings

Fig. 54.



Larval and pupal structures of *Aëdes* (*Stegomyia*) *annandalei* : **a**, tail-end ; **b**, comb-plate ; **c**, pecten-teeth ; **d**, metathoracic pleural spines ; **e**, antenna ; **f**, mentum ; **g**, paddle.

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* Brug (1931, p. 22) states that all ♂♂ of *A.* (*S.*) *annandalei*, reared by him in Dutch East Indies, have the 4th hind tarsal segment black, and suggests that *A.* (*S.*) *craggi*, which I described from the ♂ only, may be the ♂ of *annandalei*. This, however, is not the case, as the two species are quite distinct in the structure of the ♂ hypopygium. The ♀♀ of the two species are probably very similar, possibly indistinguishable. Brug does not describe or figure the ♂ hypopygium. Borel (1928, p. 97) describes the ♂ from Cochin China also as having the last three hind tarsal segments brown or black. In this case, from his figure of the ♂ hypopygium, it is evident that he had *annandalei* before him. The tarsal markings on the fore and hind legs are as in the ♀.

on tarsal segments 1–4 on hind legs, that on 4 occupying nearly whole segment.

LARVA (fig. 54) *.—*Antenna* : shaft smooth, about 0·26 mm. long, 6 times length of greatest width, hair resembling a short thick bristle arising nearer apex than base of shaft. Preclypeal spines fairly long and very slender. Lateral hairs of *thorax* of 1–3 fairly long branches. *Comb* of 5–6 large simple teeth arising in a row along posterior margin of a semicircular chitinised plate ; bases of teeth finely fringed. *Siphon* about twice length of diameter at base. Pecten of 8 rather small simple teeth. Hair-tuft of 2–3 fine branches at about middle of tube near posterior border ; *osc* long and single ; *isc* 2-branched ; *lh* fairly long, of 2 subplumose branches. Papillæ and fan-hairs long, former rounded at ends.

HABITAT.—Tree-holes and bamboos.

DISTRIBUTION.—Common in NORTH BIHAR, NORTH and EAST BENGAL, and ASSAM, and is found up to 5–6,000′ in the hills. It is also present in the ANDAMANS and in SOUTH-WEST INDIA. No specimens have been seen from Burma, but it doubtless occurs there. Recorded from COCHIN CHINA and DUTCH EAST INDIES. [A specimen from Huchow, Chekiang, CHINA (*Lan-Chou Feng*), differs in some respects from the Assam form, and may represent a distinct variety or species.]

112. **Aëdes (Stegomyia) craggi** Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 227 (♂). TYPE-LOC. : Haflong, Cachar Hills, Assam, viii. 1922 (*Barraud*). TYPE : ♂ in Brit. Mus.

Aëdes (*Stegomyia*) *purii* Barraud, 1931, Ind. Journ. Med. Res. xix, p. 226 (♂). TYPE-LOC. : Marianbarrie Tea Estate, near Sukna, Darjeeling dist., 500′, viii. 1928 (*I. M. Puri*). TYPE : 2 co-type ♂♂, one in Brit. Mus., one in M.S.I. coll., Kasauli.

ADULT.—*A.* (*S.*) *craggi* is at present known only from three ♂♂. These agree in markings with the form of ♂ of *annandalei*, in which segments 3–5 of hind tarsi are entirely dark. The ♀ is unknown, and is probably very similar to, possibly indistinguishable from, that sex of *annandalei*.

A. (*S.*) *purii* is known only from the two co-type ♂♂, which are in poor condition, but as far as can be seen they agree in markings with the form of ♂ (also the ♀) of *annandalei*, in which the 4th hind tarsal segment is mainly white, there being only a narrow black apical ring.

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* Borel 1928 *a*, p. 97 ; Bonne-Wepster & Brug 1932, p. 100. Described and figured here from two damaged skins from Assam (*Barraud*) and one from Java (*Brug*), from all of which ♀♀ had been reared, presumably of this species rather than of *craggi*.

♂.—*Hypopygium* (figs. 53, c, 56, f) *: remarkably distinct from *annandalei* in form of *bl*, which is very large and hairy, and there are three harpago-like processes arising at the base of the plaque on the harpaginal fold.

LARVA.—Unknown.

DISTRIBUTION.—ASSAM : Haflong, Cachar Hills, viii. 1922 (2 ♂♂, including type) (*Barraud*); Nongpoh, Khasi Hills dist., vii. 1922 (*Barraud*). E. HIMALAYAN foothills: type-locality of *A.* (*S.*) *purii*.

113. Aëdes (Stegomyia) mediopunctatus Theobald, 1905.

Journ. Bomb. Nat. Hist. Soc. xvi, p. 240 (♀). TYPE-LOC. : Peradeniya, Ceylon, xi. 1901 (*Green*). TYPE : ♀ in Brit. Mus.

var. *perplexus* Leicester, 1908 (*Stegomyia perplexa*), Cul. Malaya, p. 83 (♂ & ♀). TYPE-LOC.: Kuala Lumpur and The Gap, Selangor, Malay Penin. (*Leicester*).

var. *submediopunctatus* Barraud, 1923, Ind. Journ. Med. Res. x, p. 781 (♀). TYPE-LOC. : Nagargali, Bombay, Deccan, viii. 1921 (*Barraud*). TYPE : ♀ in Brit. Mus.

var. n. *sureilensis*. TYPE-LOC. : Sureil, Darjeeling dist., x. 1922 (*Barraud*). TYPE : ♀ in Brit. Mus. (*vide* below).

ADULT †.—Ornamentation shown in Pl. VI, fig. 10, and Pl. VIII, fig. 4. Wing about 2·5–3 mm.

♀.—Resembles *A.* (*S.*) *annandalei* fairly closely, but in that species the white area on front of mesonotum is rounder and not continued back towards the scutellum (*cf.* Pl. VI, figs. 9 & 10), and the scutellar scales are black on mid-lobe, white on lateral lobe, whereas in the type-form of *mediopunctatus* they are white on mid-lobe, dark brown on lateral lobes. Specimens of *A.* (*S.*) *mediopunctatus* and *annandalei* in which the mesonotum and scutellum are denuded are difficult to separate, but this may be done on the markings of the outer side of hind femur. In the former this part is white from base to knee along the ventral border, except for a small dark interruption some distance from knee; in the latter there is a broad subapical black ring.

♂.—Palpi about length of proboscis, with small white markings at base of last two segments and two broader white rings nearer base. Segment 4 of hind tarsi white, as in ♀. *Hypopygium* (fig. 51, b): remarkably distinct in the form of the style, which is forked and bears a number of hairs and bristles. Coxite comparatively wide, with an area at the apex carrying a group of long hairs.

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* The ♂ hypopygium of *A.* (*S.*) *purii* appears to be identical in structure with that of *craggi*. It seems probable, therefore, in view of what is known of variation in tarsal markings in this group of closely allied species, that *craggi* and *purii* are varieties of one species.

† Theobald 1907, p. 187; Barraud 1923 *a*, p. 780, and 1923 *f*, p. 226; Borel 1928 *a*, p. 87.

var. *perplexus* Leic.—Differs from type-form in having both the 4th and 5th hind tarsal segments entirely white. This form is not known in India at present, but intermediate forms occur in which there is some pale scaling at base of 5th hind tarsal segment.

var. *submediopunctatus* Barraud.—Differs slightly from the type-form in having only one white band on tarsi of fore and mid-legs (at base of 1st segment).

var. n. **sureilensis**, ♀.—*Head*: as in type-form. *Thorax*: a broad longitudinal median band of white scales from front margin, narrowing posteriorly, and running back to antescutellar space, where it divides; on either side of median line posteriorly, between wing-roots, are two narrow longitudinal lines of pale scales with a yellow tinge; lateral to these there are broad white scales over wing-roots, continued anteriorly along margin of mesonotum on to *ppn* and *apn*. Scutellum with flat broad white scales on all lobes. *Legs*: fore and mid-femora black, with a white line beneath for whole length, a white knee-spot on anterior aspect of mid-femur, hind femur white on basal ½, and white scaling beneath continued to underside of knee, without any dark interruption, a white knee-spot on outer aspect, otherwise black. Tibiæ black, with white scaling beneath at base, most pronounced on hind leg; fore tibiæ, when viewed from behind, with brassy sheen for whole length. Fore and mid-tarsi black, with small white markings, chiefly on upper side, at base of segments 1 and 2. Hind tarsi with well-marked white rings to first two segments, segment 4 white except at tip, 3 and 5 black. *Abdomen*: black, with narrow basal snow-white bands on IV–VII, a few pale scales at base of III; large basal lateral white patches on I–VI. Sternites hidden.

Known only from one ♀. It is very similar to the type-form, but differs in the scaling of the scutellum and in marking of hind femur. The specimen may be an unusual variation only, or there is a possibility that it may belong to a distinct species.

LARVA *.—Very similar to *A.* (*S.*) *annandalei*; according to Borel differs as follows:—Pecten-teeth with more conspicuous lateral denticles; siphonal tuft of 3 subapical branches; lateral hair of anal segment of 2 simple branches (not subplumose). In larvæ of both species the comb-teeth are 5 in number and arise from the posterior margin of a semicircular chitinised plate.

HABITAT.—Bamboos.

DISTRIBUTION (as checked by author from examination of specimens).—BOMBAY DECCAN: Nagargali, 13. viii. 1921

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* Borel 1928 *a*, p. 90.

(*Barraud*). N. KANARA: Yellapur, x. 1921 (*Barraud*). E. HIMALAYAS: Mungpoo, Sureil, and Tindharia, all Darjeeling dist., x. 1922 (*Barraud*). ASSAM: Nongpoh, Khasi Hills dist., vii. 1922 (*Barraud*). Shillong, Khasi Hills dist., vi. 22 (*Barraud*); Haflong, Cachar Hills, viii. 1922 (*Barraud*); MALABAR COAST, x. 1915 (*Khazan Chand*).

114. **Aëdes (Stegomyia) edwardsi** Barraud, 1923.

Ind. Journ. Med. Res. x, p. 784 (♂ & ♀). TYPE-LOC.: Andaman Is., ix. 1911 (*Christophers*). TYPE: ♂ & ♀ in Brit. Mus.

var. *tulagiensis* Edwards, 1926, Bull. Ent. Res. xvii, p. 101 (♀)., TYPE-LOC.: near Tulagi Hospital, Santa Cruz Island, Solomon Is., i. 1926 (*Carment*). TYPE: ♀ in Brit. Mus. (not known in Indian region).

ADULT †.—Ornamentation shown in Pl. VI, fig. 5, and Pl. VII, fig. 3 ‡. Size and shape of small white spot on front of mesonotum subject to some variation. Scutellar scales white on all lobes.

♂.—*Hypopygium* (fig. 53, **b**): 9*t* with prominent median lobe and small submedian lobes; coxite and style both rather long; *bl* small, with hairy rounded extremity.

LARVA.—Unknown.

DISTRIBUTION.—ANDAMAN IS. *, ix. 1911 (*Christophers*), viii. 1926 (*G. Covell*).

Recorded also from COCHIN CHINA, and the var. mentioned above from SOLOMON IS. ‡

115. **Aëdes (Stegomyia) w-albus** Theobald, 1905.

Ann. Mus. Nat. Hung. iii, p. 74 (*Stegomyia w-alba*) (♀). TYPE-LOC.: "India Orientalis," 1902 (*Biró*). TYPE: ♀ in Nat. Mus. Hungary, Buda Pest.

Stegomyia argenteomaculata Theobald, 1907, M.C. iv, p. 184 (♀). TYPE-LOC.: Narcondam Is., Bay of Bengal (*G. Rogers*). TYPE: ♀ in Brit. Mus.

Stegomyia imitator Leicester, 1908, Cul. Malaya, p. 89 (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

Stegomyia minutissima Theobald, 1910, Rec. Ind. Mus. iv, p. 9 (♀). TYPE-LOC.: Sukna, Darjeeling dist., 500′, vii. 1908 (*Annandale*). TYPE: ♀ in Ind. Mus.

Aëdes christianus Dyar, 1921, Insec. Ins. Mens. ix, p. 148 (♂ & ♀). TYPE-LOC.: Canton and Honan, China (*C. W. Howard*). TYPES: 5 ♂♂ and 3 ♀♀ (in U.S. Nat. Mus., coll. C. W. Howard, and coll. C. S. Banks, Manila, P.I.).

ADULT ♀ §.—Ornamentation shown in Pl. VI, figs. 6–8,

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† Borel 1928 *a*, p. 98.

‡ [*A.* (*S.*) *meronephada* (Dyar & Shannon) of Philippine Is. has thoracic ornamentation similar to *edwardsi*, but last two hind tarsal segments entirely dark.]

§ Theobald 1907, p. 180, and 1910, p. 168 (*minutissima*); Edwards 1913 *b*, p. 225, and 1932, p. 164 (syn.); Barraud 1923 *a*, p. 782; 1923 *f*, p. 228; Bonne-Wepster & Brug 1932, p. 107.

and Pl. VIII, fig. 3; markings of thorax rather variable. Scutellar scales black at base of lobes, otherwise white, subject to some variation. Extent of white scaling on 4th hind tarsal segment shows some variation, as in other species in this group. The presence of a round white spot in middle of anterior surface of mid-femur should be noted.

♂.—*Hypopygium* (fig. 49): *bl* with rounded hairy tip, a few hairs proximal to this on harpaginal fold; style and its appendage both long.

LARVA.—Unknown.

DISTRIBUTION.—Widely spread from the PUNJAB to BIHAR and NORTH BENGAL, and through Peninsular India to CEYLON. Apparently uncommon or absent from Assam and Burma.

Known also from SIAM, SOUTH CHINA, FORMOSA, and MALAYA. Specimens sent to me from the Philippines as *A.* (*S.*) *gardneri* Ludl. agreed in ♂ hypopygial structure with *w-albus* *.

116. **Aëdes (Stegomyia) albopictus** (Skuse), 1894 †.

Ind. Mus. Notes, iii, p. 20 (*Culex*) (♀). TYPE-LOC.: Calcutta. TYPE: ♀ in Sydney Mus.

ADULT (Pl. VI, figs. 2 & 14, and Pl. VII, fig. 2).—Resembles the next six species in having a narrow silvery-white median line running nearly whole length of mesonotum; broad white rings on all segments of hind tarsi, etc.

♀.—Black, with snow-white markings. Scutellar scales flat and snow-white on all lobes. Markings not subject

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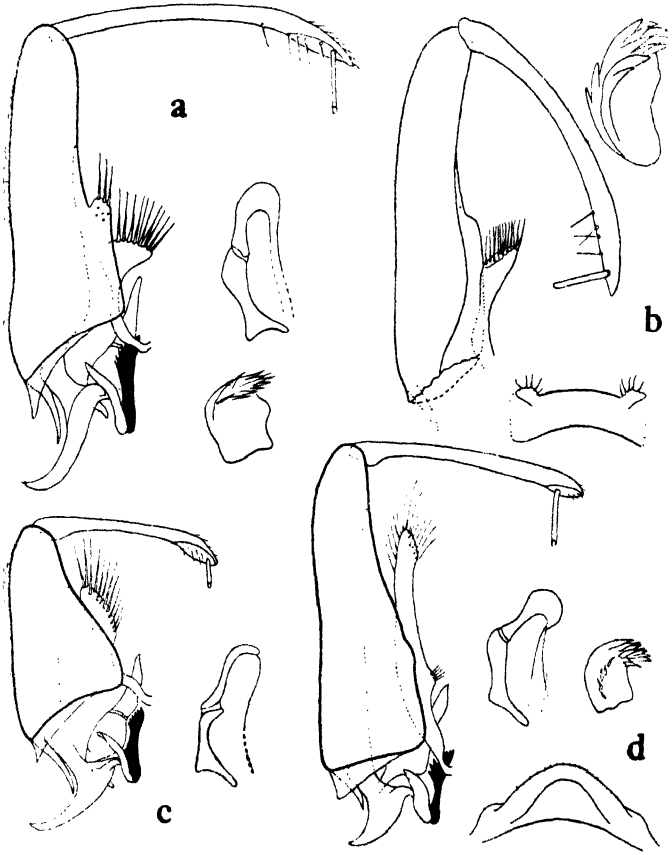
* [*A.* (*S.*) *gardneri* Ludlow, of Philippine Is., is closely related to *w-albus*, but differs as follows:—Subapical black ring of hind femur interrupted ventrally, white scales reaching from base to tip on under surface and on lower half of anterior surface; last hind tarsal segment mainly white; white sublateral patches of mesonotum always widely disconnected in front.]

† There seems little doubt that the above name is correctly restricted to the common Indian species which was previously known as *S. scutellaris* Theo. (nec Walker), but the synonymy usually quoted is open to doubt, as it has been found quite recently that at least three other species have been confused under this name. Until an examination of the hypopygia of the type ♂♂ of *S. samarensis* Ludlow and *S. quasinigritia* Ludlow (which are in the U.S. Nat. Mus.) has been made, it is not possible to say whether these names should be regarded as synonyms of *A.* (*S.*) *albopictus* or not. *S. nigritia* Ludlow was described from the ♀ only, so the identity of this species must remain in doubt, as at present it has not been found possible to separate the ♀♀ of several species in this group.

The following references most probably concern *A.* (*S.*) *albopictus* as now restricted:—Theobald 1901 *a*, p. 298 (*scutellaris*); Leicester 1908, p. 86 (*scutellaris*); Edwards 1917, p. 209; Barraud 1923 *a*, p. 779, and 1931 *b*, p. 222; Brug 1924 *b*, p. 41; Borel 1928 *a*, p. 83; Martini 1930, p. 238; Bonne-Wepster & Brug 1932, p. 73.

to much variation, except width of white tarsal bands, especially that on 4th hind tarsal segment, as in some other species. A line of flat silvery scales on border of mesonotum in front of wing-root, but not continued over wing-root as in *A.* (*S.*) *scutellaris*; white scales on pleuræ in irregular patches, not in regular lines as in *A.* (*S.*) *scutellaris*; white transverse bands on abdomen at bases of segments.

Fig. 55.



♂ hypopygial structures of *Aëdes*, subgenus *Stegomyia*: **a**, *flavopictus*; **b**, *scutellaris*; **c**, *albopictus*; **d**, *unilineatus*.

♂.—Very similar to ♀. *Hypopygium* (figs. 55, **c**; 56, **a**): shape of *9t* characteristic, apical border produced in middle as a blunt point.

LARVA * (fig. 57, a–f) (skins definitely identified as this species from resulting ♂♂).—*Antenna*: shaft about 10 times as long as wide, smooth, with single hair arising rather more than half-way from base. *Frontal hairs* all placed far forward, all fine and inconspicuous; *A* near base of antenna, with 2–3 fine branches; *C* internal and about level with *A*, usually single, fairly long; *B* single but fairly frayed, some distance from, but directly in front of, *C*; *d* slightly anterior and internal to *B*, with a number of fine branches; *e* single, fine, and long. Lateral hairs of *thorax* of moderate length, of 1–3 branches, pleural tubercles with minute sharp thorn-like processes with several points (fig. 57, f). Fairly long lateral single or 2-branched and smaller 3-branched hairs on *abdomen*. Comb of 8–12 large strong teeth, without lateral denticles, in a single row, not arising from a chitinised plate. *Siphon* rather more than twice length of diameter at base. Pecten of 7–14 small teeth, with basal lateral denticles. Tuft of 2–3 branches at about middle of siphon, usually just beyond most apical pecten-tooth. *Anal segment* nearly enclosed in chitinous ring; a few minute spines on hind margin towards dorsum; *lh* of 2 long branches. Both *isc* and *osc* single and long, or inner may be split into two. Fan-hairs fairly long but not numerous (8–10), arising from small fan-plate; papillæ long, tips rounded.

HABITAT.—Tree-holes, bamboos, leaf-axils; only rarely in artificial receptacles or rock-pools.

DISTRIBUTION.—A very common species throughout India, including ASSAM and BURMA, also in the ANDAMANS and CEYLON. Occurs up to 5–6,000′ in the hills.

The range probably extends throughout the Oriental region to Australia. Owing to the recent discovery of several closely allied species apparently differing only in the structure of the ♂ hypopygium, previous records—except those given by me (1931, p. 223), which were checked by examination of ♂♂—are not entirely reliable.

117. **Aëdes (Stegomyia) pseudalbopictus** Borel, 1928.

Arch. des Inst. Pasteur d'Indochine, p. 85 (♂ & ♀). TYPE-LOC.: Terres Rouges, Cochin China (*Borel*). TYPE: location unknown.

ADULT †.—Apparently indistinguishable from *A.* (*S.*) *albopictus*, except in structure of ♂ terminalia. Palpi of ♂ longer than proboscis by rather more than ½ length of terminal segment.

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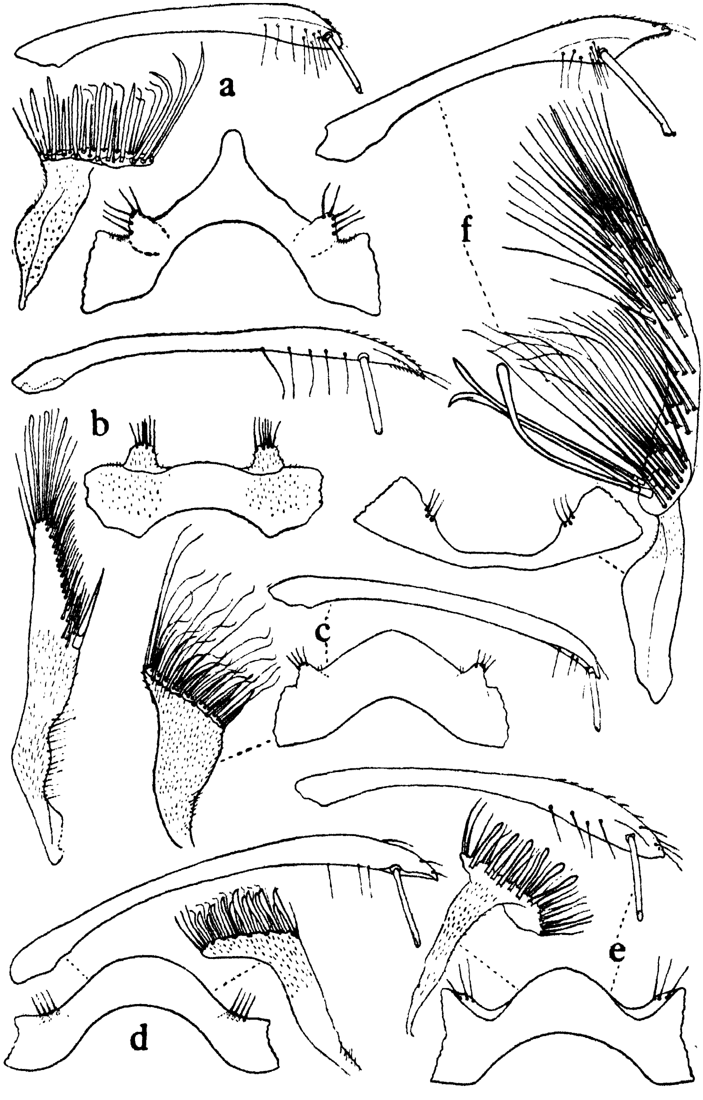
* Barraud 1923 *h*, p. 497; Senior-White 1927, p. 68; Borel 1928 *a*, p. 84; Martini 1930, p. 239; Bonne-Wepster & Brug 1932, p. 76.

† Barraud 1931 *b*, p. 223; Bonne-Wepster & Brug 1932, p. 81.

♂.—*Hypopygium* (fig. 56, **b**): 9*t* nearly flat in middle, a pair of large hairy sublateral lobes. Coxite (when mounted flat) rather more than 3 times length of greatest width;

Fig. 56.



♂ hypopygial structures (style, basal plaque, and 9th tergite) of *Aëdes*, subgenus *Stegomyia*: **a**, *albopictus*; **b**, *pseudalbopictus*; **c**, *novalbopictus*; **d**, *subalbopictus*; **e**, *flavopictus*; **f**, *craggi*.

bl unusually long and narrow, with one strong spine-like process and numerous hairs distal to it, several of which, at apex, are clubbed. Style comparatively long and slender, appendage stout, arising some distance from the pointed tip of style.

LARVA †.—Very similar to *A.* (*S.*) *albopictus*, but (according to Borel) hair on antenna shorter and arising almost exactly at the middle point of the shaft ; comb-teeth rather longer and more slender, with numerous very fine spinules at base ; pecten of fewer teeth (6 noted, but this number is almost certainly subject to variation), teeth shorter and wider, less chitinised, and with lateral denticles along one side for nearly whole length. Siphonal tuft of 2 branches.

HABITAT.—Bamboo-stumps (*Borel*).

DISTRIBUTION.—NORTH BENGAL : Marianbarrie Tea Estate *, and Sukna *, Darjeeling dist., viii. 1928 (*Puri*). BOMBAY DECCAN : Nagargali *, viii. 1921 (*Barraud*).

Originally described from COCHIN CHINA, and since recorded from SUMATRA.

118. **Aëdes (Stegomyia) novalbopictus** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 224 (♂). TYPE-LOC. : Pusa, Bihar, vii. 1916 (*S. K. S.*). TYPE : ♂ in Brit. Mus.

ADULT.—Resembles *A.* (*S.*) *albopictus* very closely. Palpi of ♂ about length of proboscis.

♂.—*Hypopygium* (fig. 56, **c**) : 9*t* with middle part forming a wide, slightly rounded lobe, with sometimes a very small rounded projection in the centre of apical margin ; sublateral hairy lobes fairly well developed ; *bl* with broad stem, numerous hairs of varying lengths, many with bent tips, arising from apex, and a row of slender flattened spines along sternal side ; these spines often appear sharply pointed, but are actually slightly expanded below the tips. Style moderately long and of even width throughout ; appendage arising very near tip.

LARVA (fig. 57, **n**–**q**) (three larval skins definitely identified as this species by examination of resulting ♂♂).—Very similar to *A.* (*S.*) *albopictus* ; appears to be indistinguishable from *flavopictus*. Differs from *albopictus* in length of siphon, which is 3 times length of diameter at base, instead of only slightly more than twice. Antennal shaft 7–8 times length of greatest width.

HABITAT.—Tree-holes.

DISTRIBUTION.—♂♂ have been examined from the following places :—BIHAR : Pusa, various dates from 1908 to 1931.

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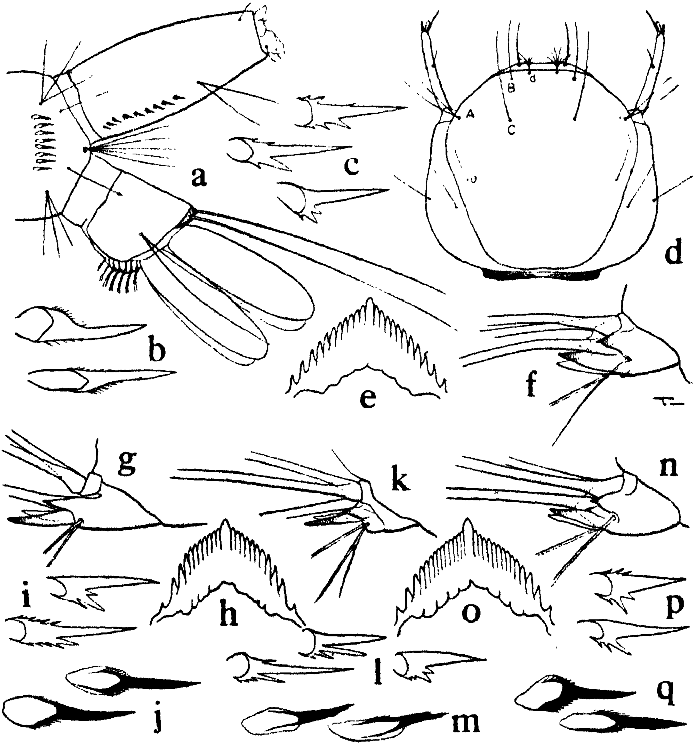
† Borel 1928 *a*, p. 87.

ORISSA: Ranchi, viii. 1922 (*T. B. Fletcher*). PUNJAB: Koti, between Kasauli and Kalka, iii. 1931 (*Barraud*), bred out from tree-hole material. BOMBAY: Harbour, Elephanta Island, and Trombay, vii. 1921 (*Barraud*); Deccan, Belgaum, viii. 1921 (*Barraud*).

Fig. 57.



Larval structures of *Aëdes* (*Stegomyia*): **a–f**, *albopictus* (**b**, comb-teeth; **f**, base of metathoracic pleural hairs); **g–j**, *flavopictus*; **k–m**, *unilineatus*; **n–q**, *novalbopictus* (base of metathoracic pleural hairs, mentum, pecten- and comb-teeth).

119. **Aëdes (Stegomyia) subalbopictus** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 225 (♂). TYPE-LOC.: Belgaum, Bombay Deccan, viii. 1921 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT.—Known only from the type-specimen; resembles *A.* (*S.*) *albopictus* very closely in ornamentation of head, thorax, and legs, but differs in having dorsum of abdomen entirely dark, without any indication of basal white bands, though with small basal, lateral, silvery-white patches on tergites. Palpi are about same length as proboscis.

♂.—*Hypopygium* (fig. 56, **d**) : *9t* with middle part forming a wide curved lobe, sublateral lobes small, not projecting, each with about 4 hairs. Coxite rather more than 3 times length of greatest width ; *bl* with long, moderately broad stem, apex carrying a number of slightly curved blade-like processes and hairs, many of the latter with hooked tips, hairs and processes all about same length. Style unusually long, tip pointed, appendage arising some little distance from it.

LARVA.—Unknown.

HABITAT.—Tree-holes.

DISTRIBUTION.—Known only from the type-locality.

120. **Aëdes (Stegomyia) flavopictus** Yamada, 1921.

Ann. Zool. Jap. x, p. 52 (♂ & ♀). TYPE-LOC. : Shiba, Tokyo, Japan, iv. 1916 (*Yamada*). TYPE : 2 ♀♀, 3 ♂♂, syntype, Govt. Inst. Infect. Dis., Tokio.

ADULT *.—Very similar to *A.* (*S.*) *albopictus*, differing in mesonotal markings, which (except for the median silvery line) are usually of a yellowish colour. In some specimens the yellowish tinge is faint, or even absent, and in these cases it is very difficult, if not impossible, to separate the ♀♀ of the two species. ♂ palpi only very slightly longer than proboscis.

♂.—*Hypopygium* (fig. 56, **c**) : *9t* moderately wide, middle part produced into a rounded lobe, sublateral lobes not well developed and with few hairs ; *bl*, as seen when mounted separately, with narrow stem and wide apical part carrying flattened, slightly clubbed processes, on sternal aspect, and hairs, both these and processes all almost same length. Style very similar to *albopictus*, but both this and appendage rather longer.

LARVA (fig. 57, **g–j**) (skins definitely identified as this species from resulting ♂♂).—Differs from *A.* (*S.*) *albopictus* in following details † :—Siphon rather more than 3 times length of diameter at base ; tuft of 4–5 branches, usually arising some distance from most distal pecten-tooth ; single hair towards tip of siphon on anterior border longer and more distinct ; stellate hairs on thorax and abdomen with stouter branches ; antenna about 8 times length of greatest breadth ; head and siphon usually darker ; *lh* often 3-branched.

HABITAT.—Tree-holes, usually at 5,000′ or more.

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* Barraud 1923 *f*, p. 225 ; 1931 *b*, p. 224.

† [In addition to the differences noted by the author, there appear to be small distinctions, perhaps of specific value, between the larvæ of the *albopictus* group in the branching of the metathoracic pleural hairs and in the form of the tubercle from which these hairs arise. These points are illustrated in fig. 57, **f**, **g**, **k**, **n**.]

DISTRIBUTION (as checked from ♂♂ by author).—ASSAM: Shillong, 5,000′, vi. 1922 (*Barraud*). W. HIMALAYAS: Murree, 7,000′, 1922 (*Gill*); Kasauli and Krol Mt., near Solan, 6–7,000′, vii.–ix. 1924–30 (*Barraud*). S.W. INDIA: Coorg, Mercara, vi. 1927 (*J. D. Baily*).

121. **Aëdes (Stegomyia) scutellaris** (Walker), 1859.

Proc. Linn. Soc. Lond. iii, p. 77 (*Culex*) (♀). TYPE-LOC.: Aru Is. (*Wallace*). TYPE: ♀ in Brit. Mus.

Culex variegatus Doleschall (nec Schrank), 1858, Nat. Tijd. Ned.-Ind. xvii, p. 77 (♀ ?). TYPE-LOC.: Amboina, East Indies. TYPE: non-existent (formerly in Vienna Mus.).

Culex zonatipes Walker, 1861, Proc. Linn. Soc. Lond. v, p. 229 (♀). TYPE-LOC.: Dorey, New Guinea. TYPE: ♀ in Brit. Mus.

var. *pseudoscutellaris* Theobald, 1901, Entom. lxiii, p. 156 (♀). TYPE-LOC.: Suva, Fiji (*Jepson*). TYPE: 3 co-type ♀♀ in Brit. Mus.

var. *hebrideus* Edwards, 1926, Bull. Ent. Res. xvii, p. 102 (♂ & ♀). TYPE-LOC.: Espiritu Santo, Hog Harbour, New Hebrides, vi.–viii. 1925 (*Buxton*). TYPE: ♂ & ♀ in Brit. Mus.

var. *tongæ* Edwards, 1926, Bull. Ent. Res. xvii, p. 103 (♂ & ♀). TYPE-LOC.: Haapai, Tonga Is., 26. ii. 1925 (*Hopkins*). TYPE: ♂ & ♀ in Brit. Mus.

var. *andrewsi* Edwards, 1926, Bull. Ent. Res. xvii, p. 103 (♂ & ♀). TYPE-LOC.: Christmas Island, S. of Java, i. 1898 and x. 1908 (*Andrews*). TYPE: ♂ & ♀ in Brit. Mus.

var. *alorensis* Bonne-Wepster & Brug, 1932, Geneesk. Tijd. Ned.-Ind. Bÿblad ii, p. 92 (♂). TYPE-LOC.: Alor, Lesser Sunda Is. TYPE: Geneesk. Lab., Batavia, Java.

ADULT *.—Resembles *A.* (*F.*) *albopictus* and allied species in general appearance, but differs as follows:—

♂♀.—A line of flat silvery scales over each wing-root, continued nearly to lateral lobes of scutellum; two lines of similar scales across pleuræ (instead of a number of irregular patches); white markings on dorsum of abdomen removed from base of each segment and curved towards middle of each tergite, sometimes forming complete bands; white scales on all scutellar lobes, but some black ones on apical border of mid-lobe.

Specimens from the Andaman Islands appear to be intermediate in some respects between the type-form, as restricted by Edwards, and three of the varieties mentioned above, described by the same authority, but are distinct from var. *andrewsi*, from Christmas Island, which is one of the two other localities within the Oriental region where this mosquito has been found. The following characters are present

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* Edwards 1917, p. 209 (syn.); 1924, p. 370; 1926 *a*, p. 101; 1929 *a*, p. 4; 1932, p. 165; Brug 1924 *b*, p. 43; Barraud 1928 *a*, p. 654; Paine & Edwards 1929, p. 305; Bonne-Wepster & Brug 1932, p. 83 (all as *variegatus* except Edwards 1932).

in specimens from the Andamans:—Palpi of ♂ slightly shorter than proboscis, marked as in *A.* (*S.*) *albopictus*. White dorsal bands on abdomen complete, or only very slightly interrupted in middle, 3rd and following sternites with black apical bands. Hind femur with a large white spot at tip ; white ring on 4th hind tarsal segment occupying basal ⅔.

♂.—*Hypopygium* : middle part of 9*t* slightly convex ; style moderately swollen at tip ; *bl* flat-topped, with hairs and some broader blade-like processes, all about same length ; coxite comparatively long and narrow (fig. 55, **b**). The above-mentioned characters are variable in other forms of the species, and have been used to separate the different vars. referred to above.

LARVA †.—That of the Andamans form of this species is not known. Specimens of var. *pseudoscutellaris*, which Dr. P. A. Buxton very kindly sent to me from Samoa, show the following characters :—*Frontal hair A* 3-branched, *B* and *C* single, *d* anterior to all three and with a number of branches dividing off some little distance from base, *B* slightly internal to, and some distance in front of, *C*. Antenna about 6 times length of greatest width, a single hair near middle of shaft. Lateral hairs of *thorax* moderately developed, mesopleural hairs without any obvious thorn-like processes at base, but small points present at bases of metapleural hairs ; no obvious stellate hairs on thorax or abdomen, but some small fine hairs with 3–4 branches. *Comb* of 10–12 strong teeth in a single row, delicately fringed at bases, not arising from a chitinised plate. *Siphon* 2–2½ times length of diameter at base. Pecten of 10–14 teeth, each with 2–4 denticles at base. Hair-tuft of 4–5 fine branches, base at about middle of tube or slightly nearer apex than base. *Anal segment* almost enclosed in chitinisation, some small spines on posterior margin towards dorsum ; *isc* usually of 3 fairly long branches ; *lh* of 2 long fine branches ; fan and fan-plate moderately developed. Dorsal papillæ about twice length of segment, ventral pair shorter, both pairs bluntly pointed or slightly rounded.

HABITAT.—In Samoa, chiefly coconut husks and shells, tins, tree-holes, and concrete drains.

DISTRIBUTION.—In Indian region, ANDAMANS * only, vii. 1926 (*Sobha Ram*).

Known also from CHRISTMAS ISLAND (S. of Java) ; SUMATRA, DUTCH EAST INDIES (eastern islands) ; and PACIFIC ISLANDS.

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† Buxton & Hopkins 1925, pp. 295, 297, 300 ; 1927, pp. 110–113 ; Bonne-Wepster & Brug 1932, p. 86.

122. **Aëdes (Stegomyia) unilineatus** (Theobald), 1906.

2nd Rept. Wellc. Res. Lab. p. 70 (*Quasistegomyia*) (♀). TYPE-LOC.: Bahr-el-Ghazal, Sudan, ix. 1905 (*Bray*). TYPE: ♀ in Brit. Mus.

ADULT † (Pl. VI, fig. 3).—Superficially resembles *A.* (*S.*) *albopictus*, but readily distinguished by presence of two round spots on posterior part of mesonotum and a round white spot on anterior surface of mid-femur.

♂.—*Hypopygium* (fig. 55, **d**): *9t* with a large median lobe, slightly hairy along border; coxite long and narrow; *bl* long, with rounded hairy extremity, a few small hairs on lower part near harpaginal fold.

LARVA ‡ (fig. 57, **k–m**).—*Antenna* comparatively short, about 6 times length of greatest breadth; hair-tuft represented by a single small strong hair, rather nearer apex than base. *Frontal hair A* of 2 fine barbed branches; *B* of 2 branches, each frequently widened on basal ½ and tapering to extremity; *C* single, fairly long, lying some distance posterior to *B*. Lateral hairs of *thorax* and *abdomen* moderately developed, pleural hairs with unusually small thorn-like processes at base. Many hairs on abdominal segments of stellate form, having a small number of short branches, which are stronger and blacker in some specimens than in others. Comb of about 8 large teeth, each ending in a long sharp point, occasionally one tooth may be divided and end in two points, a few very small pointed denticles at base; teeth arranged in one row and not arising from a plate. *Siphon* a little more than twice length of diameter at base, slightly tapering. Pecten of 7–12 rather small pointed teeth, each with one or two lateral denticles at base. Hair-tuft of 2–4 branches, arising just beyond most distal pecten-tooth. *Anal segment* almost enclosed in a rather narrow chitinised plate; some small spines on posterior margin towards dorsum. Both *isc* and *osc* single and long, or *isc* may be divided into 2 branches; *lh* long, barbed, either single or 2-branched (apparently usually 5-branched in the African race of this species), arising from a round clear area on the chitinised plate. Papillæ long, about 4 times length of saddle, tips rounded. Fan with few long and some shorter hairs; no definite fan-plates.

HABITAT.—Tree-holes.

DISTRIBUTION.—PUNJAB: Mahdopur *, Gurdaspur dist. (*Christophers*); Lahore *, ix. 1923 (*Sinton*); Koti *, between

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† Theobald 1910, p. 151 (*gelebeinensis*) and p. 157 (*gebeleinensis*); Edwards 1912 *a*, p. 13 (*Howardina*, syn.); Barraud 1923 *a*, p. 778.

‡ Ingram & Macfie 1917 *a*, p. 81 (pupa), and 1917 *b*, p. 137; Kumm 1931, p. 69.

Kasauli and Kalka, and Beja *, near Kasauli, Himalayan foothills, viii. 1923 (*Barraud*) ; Karnal *, viii. 1928 (*Barraud*) ; Ambala *, vi. 1930 (*Barraud*) ; Pinjaur *, Patiala State, viii. 1931 (*Jamna Dass*). DELHI PROV. : Delhi *, vii. 1927 (*Senior-White*). BOMBAY : Harbour, Elephanta Island *, and Trombay *, vii. 1921 (*Barraud*).

Known also from TROPICAL AFRICA.

123. **Aëdes (Stegomyia) albolineatus** (Theobald), 1904.

Entom. xxxvii, p. 77 (♀) (*Scutomyia*). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♀ in Brit. Mus.

ADULT ♀ †.—*Head* : covered with dark brown or black scales, except for a broad median silvery area on vertex, continued downwards between eyes. Clypeus, palpi, and proboscis black, last unusually long and slender. *Thorax* : a median stripe of silvery scales on mesonotum, broader than in *A.* (*S.*) *albopictus*, and not continued back as far as level of wing-roots ; no silvery scales over wing-roots, or upon lateral margins of mesonotum, or upon *ppn* or *apn*. Scutellar scales silvery on mid-lobe, black on lateral lobes. Pleuræ with large patch of silvery scales in middle. *Legs* : fore and mid-femora black on upper or anterior surfaces, fore pair narrowly pale beneath for whole length, mid-pair broadly pale on basal ½ posteriorly and with a silvery knee-spot. Hind femur silvery on outer side for more than basal ½, except for a narrow dark dorsal line from near base, a subapical black area and a silvery knee-spot, inner surface pale on basal ½, with thin dark dorsal line, apical ½ black. Tibiæ and tarsi of fore and mid-legs black with bronzy sheen, a few pale scales dorsally at base of tarsal segment 1 on mid-leg ; hind tibiæ black, tarsi with rather narrow white rings at bases of segments 1 and 2, some white scales at bases of 3 not forming a complete ring. *Abdomen* : dorsum black, large lateral silvery patches on I–VII, in some specimens produced on dorsum to form narrow subbasal bands on VI and VII.

♂.—Palpi black, much shorter than the rather long slender proboscis. Markings as in ♀, but tibiæ and tarsi of fore and mid-legs black ; white scaling at base of segments 1 and 2 of hind tarsi only. *Hypopygium* (fig. 58, **b**) : *bl* with 4 strong spines and some weaker bristles ; appendage of style stout and arising nearer middle of style instead of near tip.

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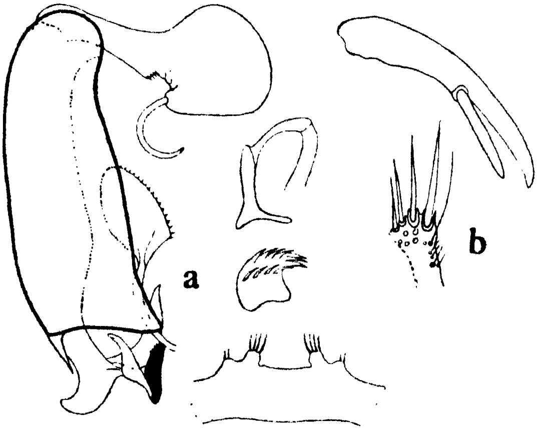
† Leicester 1908, p. 105 (*Scutomyia*) ; Edwards 1925 *a*, p. 258 ; Barraud 1927 *c*, p. 553 ; Borel 1928 *a*, p. 90 ; Paine & Edwards 1929, p. 314 ; Bonne-Wepster & Brug 1932, p. 94.

LARVA *.—Not isolated in India. [*Antenna* moderately long, smooth. Shaft-hair inserted slightly beyond middle, 1–3-branched. *Frontal hairs*: *A* with several branches; *B* single and long; *C* many-branched, almost immediately behind and some distance from *B*; *d* many-branched, but rather small, internal to *B*. *Thorax* and *abdomen* with some strong stellate hairs, and with dense microscopic pile on a large part of the integument (not always very evident in balsam mounts). Meso- and metapleural spines rather strong and dark. Comb of 10–12 long sharp teeth in one regular row. *Siphon* twice as long as broad, dark. Pecten extending ⅗ length of tube, composed of only 5–8 subequal and fairly regularly spaced teeth which have fine denticles on about their basal ½. Tuft of 4–7 branches, just before middle of tube. *Anal segment* with numerous teeth on posterior border of saddle; *isc* forming a conspicuous tuft of 8–10 branches, *osc* single as usual, *lh* 3-branched. Papillæ very short.]

Fig. 58.



♂ hypopygial characters of *Aëdes*, subgenus *Stegomyia*: **a**, *vittatus*; **b**, *albolineatus* (style, basal lobe).

HABITAT.—Tree-holes (*Barraud*). Tree-holes, tins, water-butts, axils of leaves of sago-palm, coconut-husks (*Paine & Edwards*, in Solomon Is.).

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* Brug 1924 *a*, p. 433; Borel 1928 *a*, p. 92; Paine & Edwards 1929, p. 306; Bonne-Wepster & Brug 1932, p. 96. [Briefly redescribed above from four specimens in British Museum, from Solomon Is., agreeing essentially with Brug's description and figures.]

DISTRIBUTION.—ASSAM : Haflong, Cachar Hills, viii. 1922 (*Barraud*).

Known also from MALAY PENINSULA and ARCHIPELAGO, COCHIN CHINA, PHILIPPINES, BORNEO, and SOLOMON IS.

124. **Aëdes (Stegomyia) vittatus** (Bigot), 1861.

Ann. Soc. Ent. France (4), i, p. 227 (*Culex*) (♀). TYPE-LOC. : stated to be Corsica (perhaps in error). TYPE : ♀ in Brit. Mus.

ADULT [*].—Distinct on ornamentation (Pl. VI, figs. 4 & 15, and Pl. VII, fig. 4). There are some small white spots on the mesonotum, preapical white rings on femora, and medial white rings on tibiæ. It is a somewhat aberrant species of *Stegomyia* ; there are numerous upright scales on the head extending forward on to the vertex, and a varying amount of pale yellowish scaling on proboscis, characters not present in other species of the subgenus.

♂.—*Hypopygium* (fig. 58, **a**) : distinct from all other species in the form of the style, which is much enlarged at the extremity and carries a preapical curved appendage.

LARVA [†] (fig. 52, **g–k**).—*Frontal hair A* with 4–6 branches ; *B*, *C*, and *d* single ; *B* slightly anterior to level of bases of antennæ ; *C* slightly internal, and some distance posterior to, *B* ; *d* small, slightly internal and posterior to *B* ; *e* single and fairly long. Antennal shaft about 8 times as long as wide, smooth ; tuft of 3 branches, rather nearer base than apex. Median hairs of mouth-brushes minutely toothed apically. Lateral hairs of *thorax* moderately developed and arising from chitinised tubercles. Lateral hairs on *abdominal* segments II–III branched. Comb of 6–9 large simple teeth, arranged in one row, but not always in a regular rank. *Siphon* about twice length of diameter at base. Pecten of 20–34 long pointed teeth with basal lateral denticles, extending along basal ¾ of siphon ; one, occasionally two, simple pecten-teeth detached from main rank and lying between hair-tuft and apex of siphon (a character distinguishing this from other known larvæ of the subgenus) ; hair-tuft of 4–6 branches at about ¾ from base (nearer apex of tube than in most species. *Anal segment* with chitinised saddle, not enclosing segment ;

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[*] Theobald 1901, p. 300 (as *S. sugens* Wied.) ; 1905 *c*, p. 19, and 1907, p. 199 (*Scutomyia sugens*) ; 1907, p. 262 (*Reedomyia albopunctata*) ; Patton 1905, p. 634 (*sugens*) ; Neveu-Lemaire 1905, p. 8 (*S. brumpti*) ; Edwards 1912 *a*, p. 9 (*sugens*, syn.) ; 1917, p. 210 (syn.) ; 1921 c, p. 326 ; Bacot 1916, pp. 130, 142 (*sugens*) ; Barraud 1923 *a*, p. 777 ; Borel 1928 *a*, p. 77 ; Martini 1930, p. 262.

[†] Edwards 1912 *b*, p. 375 (*sugens*) ; Barraud 1923 *h*, p. 496; Senior-White 1927, pl. vii ; Borel 1928 *a*, p. 79 ; Kumm 1931, p. 68.

lh single and short; *osc* single and long; *isc* of about 6 subequal branches. Papillæ long and pointed, about twice length of segment. Fan moderately developed, hairs divided into branches, and arising from fan-plate.

HABITAT.—Water-butts and other domestic collections of water, rock-pools, and tree-holes.

DISTRIBUTION.—Widely spread from the NORTH-WEST FRONTIER to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON. At Pusa, North Bihar, it occurs throughout the year, but is commonest in the rains.

Known also from MEDITERRANEAN REGION, AFRICA, and COCHIN CHINA.

Subgenus **AËDIMORPHUS** Theobald, 1903.

M.C. iii, p. 290. Genotype, *Uranotænia domestica* Theo.

Ecculex Felt, 1904, N.Y. State Mus. Bull. p. 391 *c*. Genotype, *Culex sylvestris* Theo.

Rcedomyia Ludlow, 1905, Can. Ent. xxxvii, p. 94. Genotype, *R. pampangensis* Ludl.

Pecomyia Theobald, 1905, Journ. Econ. Biol. i, p. 24. Genotype, *Pec. maculata* Theo.

Pseudograbhamia Theobald, 1905, Journ. Bomb. Nat. Hist. Soc. xvi, p. 243. Genotype, *Ps. maculata* Theo.

Lepidotomyia Theobald, 1905, Ann. Mus. Nat. Hung. iii, p. 80. Genotype, *L. alboscutellata* Theo.

Geitonomyia Leicester, 1908, Cul. Malaya, p. 134. Genotype, *Culex cœcus* Theo.

Leslieomyia Christophers, 1911, Paludism, no. 2, p. 68. Genotype, *L. tæniorhynchoides* Chr.

ADULT [*].—Medium-sized mosquitoes with various kinds of ornamentation and scaling. Structure of ♀ hypopygium similar to subgenus *Ochlerotatus*, but in the ♂ the phallosome is divided into lateral plates bearing teeth; there is no harpago, and the style is in many species highly modified. Proboscis usually longer than fore femur. Scales on *ppn* not broad and flat as in subgenus *Diceromyia*. Palpi of ♂ usually about length of proboscis (about ½ as long as proboscis in *nummatus*), the last two segments more or less swollen, hairy, and turned downwards. Antennæ of ♂ projecting mainly dorsally and ventrally. No lower mesepimeral bristles. Tarsal claws of fore and mid-legs of ♀ toothed, usually also larger claw on corresponding legs of ♂. Abdomen of ♀ tapering to tip, VIII completely retractile (except in *nummatus*), cerci usually long and, in dried specimens, projecting from segment VII.

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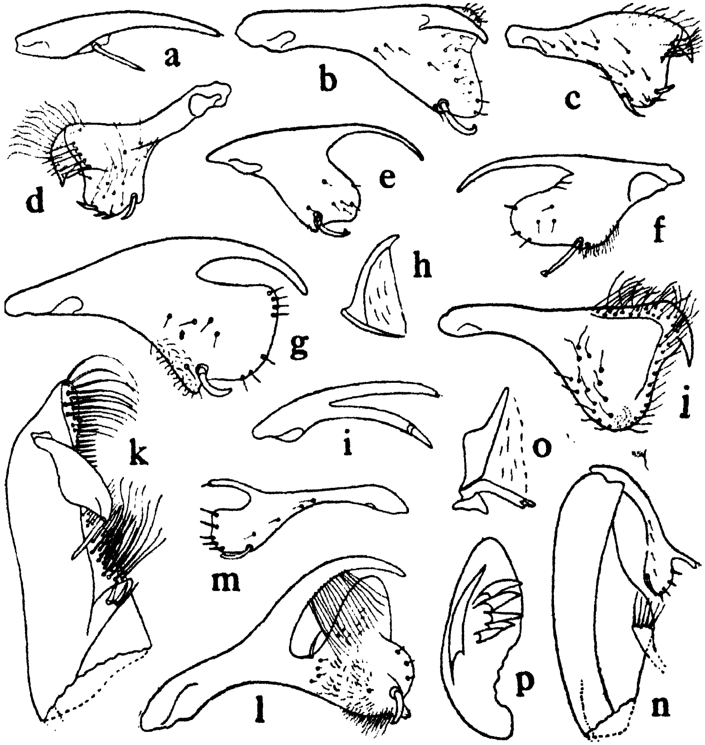
[*] Edwards 1932, p. 165.

LARVA.—Antenna with spicules on shaft. Siphon with the 2–3 most distal pecten-teeth (except in *nummatus*) much more widely spaced than those nearer base. (These characters may be present in larvæ of other subgenera.)

Fig. 59.



♂ hypopygial structures (style, etc.) of *Aëdes*, subgenera *Aëdimorphus* and (**k**) *Banksinella*: **a**, *trimaculatus*; **b**, *mediolineatus*; **c**, *jamesi*; **d**, *alboscutellatus*; **e**, *pipersalatus*; **f**, *tæniorhynchoides*; **g**, *pallidostriatus*; **h**, **i**, *nummatus* (**h**, proctiger); **j**, *culicinus*; **k**, *lineatopennis*; **l**, *nigrostriatus*; **m**, **n**, **o**, **p**, *cæcus* (coxite, style, proctiger, lateral plate of phallosome).

Key to Adults.

1.	Scutellum completely covered with flat silvery-white scales, contrasting with brown, or reddish-brown, colour of mesonotum	2.
	Scutellar scales not silvery, usually narrow and yellow (some rather broad white scales in *pipersalatus* and *cæcus*)	4.
2.	Hind tarsal segments with basal white rings only	*jamesi*, p. 249.

	Hind tarsal segments with basal and apical pale rings	*lowisi*, p. 250.
	Hind tarsi entirely dark	3.
3.	Abdominal tergites with pure white basal lateral spots, and sometimes with pale basal bands	*alboscutellatus*, p. 250.
	Abdominal tergites with a continuous yellow lateral stripe on each side	*niveoscutellum*, p. 251.
4.	Hind tarsal segments marked with distinct basal pale rings	5.
	Hind tarsi not ringed, or with only indistinct traces of rings at bases of first three segments	10.
5.	Wings speckled with light and dark scales.	6.
	Wings not speckled	7.
6.	Mesonotum brown, with pale scales forming roundish spots; some rather broad white scales on mid-lobe of scutellum	*pipersalatus*, p. 258.
	Mesonotum with numerous pale scales evenly distributed, not forming spots; narrow pale scales on mid-lobe of scutellum	*tæniorhynchoides*, p. 260.
7.	Anterior surface of mid-femur speckled with pale scales	8.
	Anterior surface of mid-femur dark brown, without speckling of pale scales	*cæcus*, p. 257.
8.	Pale scales on anterior surface of mid-femur evenly sprinkled; lobe on inner side of coxite of ♂ with numerous hooked hairs	9.
	Pale scales on anterior surface of mid-femur of ♀ arranged in definite spots, forming two longitudinal lines; lobe on inner surface of coxite of ♂ with one long hair and four long leaf-like processes	*syntheticus*, p. 256.
9.	Both claws of hind tarsi usually toothed in both sexes; proboscis of ♂ entirely dark brown; postnotum usually light brown or yellowish	*stenœtrus*, p. 255.
	Both claws of hind tarsi (in Indian specimens) usually simple in both sexes; proboscis of ♂ with pale area in middle; postnotum usually dark brown	*vexans*, p. 253.
10.	A large patch of white scales on front of mesonotum	*nummatus*, p. 265.
	No patch of white scales on mesonotum	11.
11.	Femora and tibiæ marked with longitudinal pale stripes	*pallidostriatus*, p. 261.
	Femora and tibiæ not striped	12.
12.	Mesonotum with a pair of black stripes from the front to scutellum; a black spot in front of each wing-root	*nigrostriatus*, p. 262.
	Mesonotum not marked with black stripes.	13.
13.	Integument of mesonotum with a median dark area, widest in front, and continued back nearly to scutellum; a shorter dark area each side posteriorly over each wing-base	*trimaculatus*, p. 264.
	Mesonotum without such markings	14.

14. Scales of vertex and mid-lobe of scutellum all broad and flat; legs unusually short and thick	*pulverulentus*, p. 268.
Scales of vertex and scutellum narrow; legs normal	15.
15. Mesonotum with a conspicuous median stripe of golden scales on a dark ground.	*ostentatio*, p. 267.
Mesonotum without special adornment ..	16.
16. Dorsum of abdomen dark brown, with well-marked basal creamy bands	*culicinus*, p. 252.
Dorsum of abdomen with the base and sides of each segment ochreous, with a triangular dark area in middle (♂), or with an ochreous median stripe bordered on each side with dark brown (♀).......	*mediolineatus*, p. 263.

125. **Aëdes (Aëdimorphus) jamesi** (Edwards), 1914.

Bull. Ent. Res. v, p. 77 (*Ochlerotatus*) (♀). TYPE-LOC.: Colombo, Ceylon (*James*). TYPE: ♀ in Brit. Mus.

ADULT *.—Belongs to the typical group of the subgenus, with silvery-white scales on scutellum †. Readily distinguished from its allies by basally ringed hind tarsal segments. Wing 3–4 mm.

♀.—*Head*: narrow yellowish scales on vertex, alternating patches of broad black and pale scales at sides, numerous narrow upright scales on nape, extending forwards on to vertex; a patch of narrow dark scales in middle in front. Tori, clypeus, and proboscis brown; flagellum of antenna and palpi rather darker, the last about ⅕ length of proboscis. *Thorax*: mesonotal scales dark brown, with golden scales forming indefinite spots in some specimens, especially on front border. Scutellar scales flat and silvery. Pleuræ dark brown, with three small patches of silvery flat scales; a few narrow yellowish scales on *apn* and *ppn*. *Wings*: dark scaled, usually with a small white dot at base of costa. *Legs*: dark brown; silvery spots at tips of femora and tibiæ; hind tarsi with narrow basal white rings on segments 2–5 (none on 1); small white markings at bases of one or two tarsal segments on fore and mid-legs. *Abdomen*: dark brown, with narrow basal pale bands and lateral basal pale patches.

♂.—Palpi dark brown, longer than proboscis by a little more than length of apical segment; last two segments with brown hair-tufts. *Hypopygium*: style (fig. 59, c) very similar to that of *A.* (*Aëdim.*) *alboscutellatus*, but shorter, with narrow basal portion shorter; coxite without any hair-tuft and without any regular row of long hairs.

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* Barraud 1928 *a*, p. 658.

† [The group includes several African species and one Oriental species (*A. orbitæ* Edw.), in addition to the four occurring in India.]

LARVA.—Unknown.

HABITAT.—Pools in jungle (*Barraud*).

DISTRIBUTION.—A fairly common species in PENINSULAR INDIA and CEYLON; extends as far north and east as BIHAR (Pusa). There are no records from the Punjab or the north-west, nor from Assam or Burma.

Not recorded from beyond limits of Indian region.

126. **Aëdes (Aëdimorphus) lowisi** Theobald, 1910.

M.C. v, p. 257 (*Reedomyia*) (♂ & ♀). TYPE-LOC.: Andaman Is. (*Lowis*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—Very similar to *A. jamesi*, but differing in leg-markings, as indicated in key. Segment 5 of hind tarsi pale; 1 dark at base (as in *jamesi* †).

[♂.—*Hypopygium*: style in type ♂ short and very broad, with narrow basal portion quite short; apparently indistinguishable from *jamesi*. Coxite without special arrangement of hairs.]

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality ‡. Theobald gives Ceylon, but it was found later that the specimens to which he referred were *A. jamesi*.

127. **Aëdes (Aëdimorphus) alboscutellatus** (Theobald), 1905.

Ann. Mus. Nat. Hung. iii, p. 80 (*Lepidotomyia*) (♀). TYPE-LOC.: Papua (*Biró*). TYPE: ♀ in Nat. Mus. Hungary, Buda Pest.

Reedomyia pampangensis Ludlow, 1905, Can. Ent. xxxvii, p. 94 (♀). TYPE-LOC.: Pampanga, Philippine Is. (*Whitmore*). TYPE: ♀ in U.S. Nat. Mus.

Culex argentinotus Banks, 1909, Phil. Journ. Sci. iv, p. 547 (♂ & ♀). TYPE-LOC.: Rizal, Philippine Is. (*Banks*). TYPE: ♂ & ♀ in Bureau of Science, Manila.

Aëdes omurensis Yamada, 1921, Annot. Zool. Jap. x, p. 73 (♂ & ♀). TYPE-LOC.: Omura, Kiushu, Japan. TYPES: ♂♂ & ♀♀, co-types, in Govt. Inst. Infec. Dis., Tokio.

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* Barraud 1928 *a*, p. 658.

† [The Malayan *A. orbitæ* Edw. (*tæniata* Leic.) resembles *lowisi* in having the hind tarsal rings extending over the joints, but differs in having these rings broader and whiter; segment 1 of hind tarsi also being broadly white at base. *A. orbitæ* is quite distinct in hypopygial structure from *lowisi*, but closely resembles *cæcus*.]

[‡ Recorded by Edwards (1929 *a*, p. 5) from Calopan, Mindoro, Philippine Is., but comparison of the hypopygium of the ♂ from this locality with Theobald's type ♂ from the Andamans shows that it belongs to a different species, having basal ½ or more of style slender, and a short finger-like process dorsally on distal swollen portion; coxite with row of hairs in *alboscutellatus*.]

ADULT †.—Resembles *Aëdes jamesi* in ornamentation of head, thorax, femora and tibiæ, but tarsi entirely dark. Abdomen with lateral basal white patches, not usually visible dorsally; narrow basal pale bands in some specimens, not in others. Wings with a white dot at base of costa as in *jamesi*. Palpi of ♂ longer than proboscis by nearly length of last two segments.

♂.—*Hypopygium*: small; style as in fig. 59, **d**. [Coxite with a rather regular row of long hairs extending almost whole length of upper (sternal) surface towards internal border, but no hair-tufts.]

LARVA.—Unknown.

HABITAT.—Pools in jungle (*Barraud*).

DISTRIBUTION.—BOMBAY DECCAN: Tavargatti *, Belgaum dist., viii. 1921 (*Barraud*). N. BENGAL: Sukna *, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). BIHAR: Pusa *, vi. 1913 (Agric. Res. Inst. Coll.). ASSAM: Golaghat *, Sibsagar dist., xii. 1924 and i. 1925 (*Barraud*). BURMA: Bhamo *, x. 1931 (*Feegrade*).

The range extends through MALAY PENINSULA, SIAM, DUTCH EAST INDIES, and PHILIPPINE IS. to AUSTRALIA and JAPAN.

128. **Aëdes (Aëdimorphus) niveoscutellum** Theobald, 1905.

Journ. Econ. Biol. i, p. 22 (*Reedomyia niveoscutella*) (♀); M.C. iv, p. 259, 1907 (♂ & ♀). TYPE-LOC.: India (*James & Christophers*).

ADULT ‡.—Resembles *alboscutellatus* in its entirely dark tarsi and silvery scales on scutellum, but differs from that species, as well as from *jamesi* and *lowisi*, in the following points:—*Head* with very numerous narrow scales all over vertex and nape, almost all pale; sides with flat yellowish scales, without black patches. Proboscis often largely yellowish, especially beneath. *Thorax* with the mesonotal scales uniformly light brownish, no golden scales round front margin; *ppn* more densely covered with narrow light brown scales. Scales on pleuræ light brownish, concolorous with integument. *Wings* lacking the white dot at base of costa. *Legs* with silvery spots at tips of femora smaller, none at all at tips of tibiæ; femora largely yellowish, except anterior surface of mid-femora; front and middle tibiæ almost all yellowish, leaving only a narrow dark line (running whole length) on anterior surface of front tibia and on *under* surface of mid-tibia. *Abdomen* light or dark brown dorsally, sides of tergites yellowish, forming a stripe down each side for whole length.

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† Theobald 1907, p. 261 (*Reedomyia alboscutella*); Leicester 1908, p. 132 (*Lepidotomyia*); Edwards 1922 *b*, p. 101; 1924, p. 372 (syn.); Dyar & Shannon 1925, p. 76; Barraud 1928 *a*, p. 659; Martini 1930, p. 239.

‡ Barraud 1928 *a*, p. 659; Borel 1928 *b*, p. 61.

[♂.—*Hypopygium* †: larger than in the allied species; coxites swollen, with a rather dense patch of short hair on inner side before middle, and a large patch of very long and stout bristly hairs on outer surface towards base. Style somewhat as in *jamesi*, but rather different in shape and with a more conspicuous tuft of long hair on outer edge beyond middle.]

DISTRIBUTION.—BIHAR: Pusa *, viii. 1913 (*Sharma*), vii. 1927 (*Shaffi*); Kierpur *, Purneah dist., ix. 1915 (*Paiva*).

Recorded also from Java and Cochin China ‡.

129. Aëdes (Aëdimorphus) culicinus Edwards, 1922.

Aëdes (*Ecculex*) *culicinus*, Ind. Journ. Med. Res. x, p. 271. TYPE-LOC.: Delhi, 1914 (*Christophers*). TYPE: ♂ and allotype ♀ in Brit. Mus.

ADULT §.—Resembles *Culex fatigans* in general coloration and markings, but distinguished in ♀ by form of terminal segments of abdomen (cerci long, segment VIII retractile), in ♂ by form of palpi (only a little longer than proboscis, last two segments turned downwards and hairy), and structure of hypopygium. The ♂ style (fig. 59, **j**) somewhat resembles that of *Aëdes alboscutellatus*.

LARVA.—Unknown.

DISTRIBUTION.—PUNJAB and DELHI PROVINCE only: Delhi *, as given above; Amritsar * 1911 (*Christophers*); Lahore *, ix. 1923 (*Sinton*); Karnal *, viii. 28 (*Barraud*).

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† [Theobald's type ♂ was badly damaged, but enough remains to show the above features on re-mounting the slide. A ♂ in the British Museum from Rizal, Luzon, Philippine Is. (determined by Dyar as *niveoscutella*, and agreeing in ornamentation with ♀♀ from the same place and with those from India), differs somewhat in hypopygial structure: the long bristly hairs on the coxite are spread over the tergal surface and not aggregated towards the base; style differently shaped, its hair-tuft divided into two parts. The Philippine form would seem to be specifically distinct from the Indian, and if Ludlow's *pampangensis* is not *alboscutellatus* it may be this species.]

‡ [Ludlow's type of *R. pampangensis* from the Philippine Is. is said by Dyar and Shannon to be *niveoscutellum* rather than *alboscutellatus*, as supposed by Edwards, but the point requires confirmation; the converse is suggested by the original description.]

§ Barraud 1928 *a*, p. 667.

130. **Aëdes (Aëdimorphus) vexans** (Meigen), 1830.

Culex vexans, Syst. Bechr. vi, p. 241 (♀). Type-loc. : near Berlin (*Ruthe*). Type : 2 ♀♀ in Paris Museum.

Culicada minuta Theobald, 1907, M.C. iv, p. 338 (♀). Type-loc. : India (*Christophers*) (probably Lahore). Type : ♀ in Brit. Mus.

? *Culicada eruthrosops* Theobald, 1910, M.C. v, p. 299 (♀). Type-loc. : Trincomalee, Ceylon (*Green*). Type : ♀ in Brit. Mus.

var. *nipponii* (*Culicada*) Theobald, 1907, M.C. iv, p. 337 (♀). Type-loc. : Karnizana, Japan (*Cornford*). Type : ♀ in Brit. Mus.

Adult *.—Medium-sized species with little ornamentation ; hind tarsal segments basally ringed. Wing about 4 mm.

♀.—*Head* : narrow yellowish scales on vertex, bordered laterally by dark scales, a patch of broad flat pale scales at each side ; numerous dark upright scales on nape and vertex. Palpi brown, with pale scales at tips, about ⅙ length of proboscis ; latter extensively pale beneath and at sides ; upper side brown, with scattered pale scales. *Thorax* : integument of mesonotum almost black, covered with golden-brown narrow scales. Scutellar scales narrow and pale. Scales on *apn* and *ppn* similar to those on mesonotum. Pleuræ with several patches of broad creamy or white scales. *Wings* : dark scaled. *Legs* : femora brown, speckled with pale scales †, especially anterior surface of mid-pair, where the pale scales are usually numerous and evenly sprinkled. Tibiæ also speckled when viewed from front, mainly pale when seen from behind. Hind tibia without obvious pale ring at base. Tarsi dark brown, with narrow basal pale rings to first two or three segments on fore and mid-legs, and usually to all segments on hind leg. Tarsal claws of hind legs usually simple †. *Abdomen* : dorsum dark brown, tergites with pale basal bands, usually narrowed and sometimes divided in middle, also separated from the lateral pale spots. In some specimens there are apical median pale markings on tergites also.

♂.—Palpi longer than proboscis by about length of terminal segment ‡, a pale ring at about middle of long segment, white

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* Edwards 1917, p. 218 (*Ochlerotatus*, syn.) ; 1921 *c*, p. 322 (*Ecculex*, syn.) ; 1924, p. 372 (syn.) ; Lang 1920, p. 85 ; Séguy 1924, p. 86 ; 1925, p. 68 ; Brug 1924 *b*, p. 34 ; Barraud 1928 *a*, p. 660 ; Borel 1928 *b*, p. 68 ; Martini 1930, p. 259.

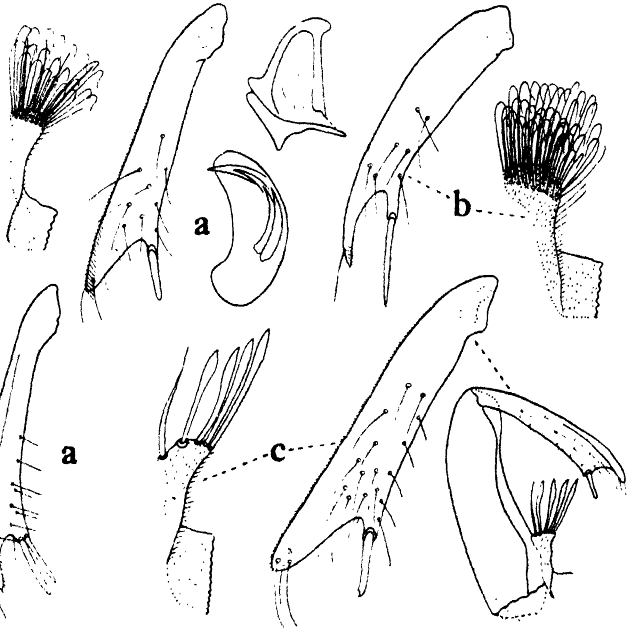
† [In European examples of *A. vexans* there are few or no pale scales sprinkled over the dark parts of the femora, and the hind claws are usually toothed, at least in ♀ ; specimens from Persia resemble those of Europe, but in specimens from other regions, including those from North and South India, Central Siberia, China, Japan, and North America, the speckling is very pronounced, especially on anterior surface of mid-femora, as noted above, and the hind claws may be simple.]

‡ [In European ♂♂ the length of the palpi is subject to much variation, as shown by Peus.]

scales dorsally at bases of last two segments, which are turned downwards and bear tufts of yellowish hairs. Proboscis with indefinite pale area at about middle, especially beneath. Other markings as in ♀. Tarsal claws of hind legs usually simple. *Hypopygium* (fig. 60, **a**) : apex of style and of appendage both rather blunt. Plaque on inner surface of coxite with a number of hooked hairs.

LARVA *.—[Typical European larvæ show the following characters :—*Antenna* ½ as long as head ; shaft with small spicules ; tuft of about 7 branches, inserted at about ⅓ length of shaft from base. Median hairs of mouth-brush with comb at tip. *Frontal hairs* : *A* with 7–12 branches ; *B* 1–4 (usually 1 or 2) ; *C* 3–5, almost directly behind *B* ; *d* 2–5, very small. *Comb* of about 10–14 sharp-pointed teeth in a patch or in one or two irregular rows. *Siphon* fully 2½ times length of diameter at base, somewhat tapered on distal ½.

Fig. 60.



♂ hypopygial structures of *Aëdes*, subgenus *Aëdimorphus* : **a**, *vexans* (basal lobe, style, proctiger, and lateral plate of phallosome ; also abnormal style, with double appendage) ; **b**, *stenœtrus* ; **c**, *syntheticus*.

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* Brug 1924 *a*, p. 436 ; Buxton & Hopkins 1927, p. 91 ; Dyar 1928, p. 236 ; Martini 1930, p. 260.

Pecten reaching slightly beyond middle of tube, of about 20 teeth, with 1–3 strong basal denticles, last two teeth larger, simple, and widely spaced; *tuft* 5–7-branched, at ⅔ length of tube. *Anal segment* nearly ringed by the saddle, posterior margin of which is without teeth or spines; *isc* 6–8 branched; *osc* single as usual; *lh* short and bifid, several ventral tufts before the fan proper. Papillæ nearly twice length of saddle, pointed.

No Indian larvæ are available for comparison, but specimens in the British Museum from Fiji and Samoa, as well as some (probably this species, but not isolated) from Nuwara Eliya, Ceylon (*Major MacDougall*), differ from the European form in having fewer branches in the frontal hairs, *B* being single (in all specimens examined) and *C* single or double.]

DISTRIBUTION.—This mosquito has a very wide range, occurring in the PALÆARCTIC, NEARCTIC, and ORIENTAL REGIONS, and in several of the PACIFIC ISLANDS, occurring up to a height of 10,000 ft. in TIBET (Yatung, *Lt.-Col. Bailey*). In India it is fairly common from the N.W. FRONTIER, through NORTHERN and CENTRAL INDIA, to ASSAM, BURMA, and CEYLON. In the mountains of South India and in the higher parts of Ceylon it seems to be at least partly replaced by *Aëdes stenœtrus*, described below.

131. **Aëdes (Aëdimorphus) stenœtrus** (Theobald), 1907.

M.C. iv, p. 395 (*Culex*) (♀). TYPE-LOC.: Maskeliya, Ceylon, 4,000′ (*Green*). TYPE: ♀ in Brit. Mus.

Culex pseudostenœtrus, Theobald, 1910, M.C. v, p. 343 (♀). TYPE-LOC.: Hakgala, Ceylon, 6,500′ (*Green*). TYPE: ♀ in Brit. Mus.

ADULT †.—Very similar to *Aëdes vexans*, as described above, but differs as follows:—Tarsal claws of hind legs toothed in both sexes (this character may be subject to occasional variation). Hind tibia with a more distinct narrow white ring at base. Postnotum usually pale brown or yellowish (in *A. vexans* usually dark brown). Proboscis of ♂ entirely dark brown. Palpi of ♂ longer than proboscis by only ½ length of terminal segment. Style of ♂ *hypopygium* (fig. 60, **b**) with a longer and more pointed appendage; *bl* larger, and with more numerous hooked hairs.

LARVA.—Unknown.

DISTRIBUTION.—CEYLON: type-localities, as given above; Ohiya, iv. 1928 (*Henry*). SOUTH INDIA: Nilgiri Hills *, 1915 (*Khazan Chand*); Coonoor * (*Patton*); Palni Hills, Kodaikanal * (*Patton*; *Fletcher*).

Not recorded from elsewhere.

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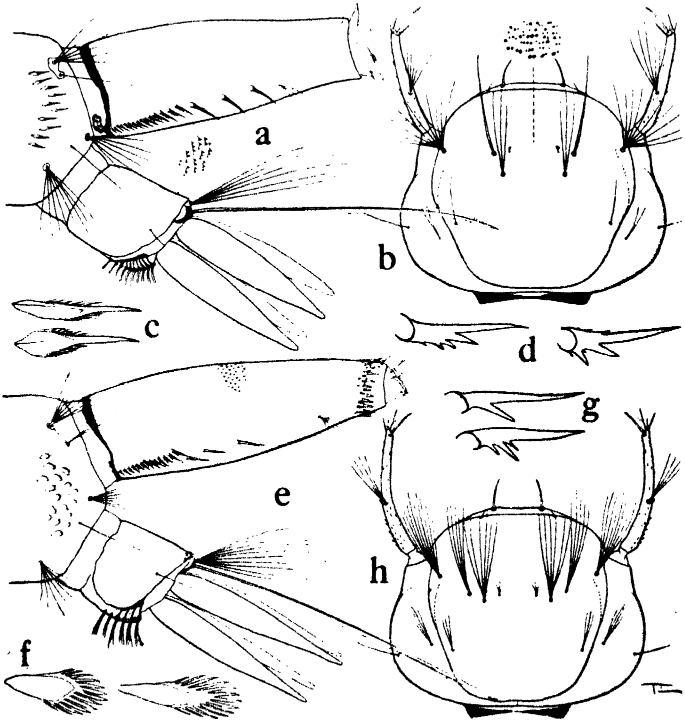
† Barraud 1928 *a*, p. 661.

132. **Aëdes (Aëdimorphus) syntheticus** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 375, nom. nov. for *Aëdes*(*Aëdimorphus*) *fisheri* Barraud, 1928, Ind. Journ. Med. Res. xv, p. 662 (♂ & ♀).
TYPE-LOC. : Bombay Deccan, Tavargatti, viii. 1921 (*Barraud*).
TYPE : co-type ♂♂ and ♀♀ in Brit. Mus.

ADULT.—closely resembles *Aëdes vexans* and *A. stenœtrus*, but may be distinguished as follows :—Pale scales on anterior surface of mid-femur of ♀ arranged in definite small spots, forming more or less two longitudinal rows (spots usually less definite in ♂). Palpi of ♂ longer than proboscis by nearly length of last segment Proboscis of ♂ with pale area in middle, the border of this area nearest the base sharply defined. Apical $\frac{1}{3}$ of proboscis of ♀ blackish-brown on upper side, remainder dark brown, speckled with pale scales. Postnotum usually dark brown. Basal white abdominal bands

Fig. 61.



Larval structures of *Aëdes*, subgenus *Aëdimorphus* : **a–d**, *syntheticus* ; **e–h**, *cœcus* (**a** and **b** with details of structure of chitin of siphon and head respectively).

of fairly even width, or slightly narrowed in middle. Claws of hind tarsi simple in both sexes. Style of ♂ *hypopygium* (fig. 60, **c**) very similar to that of *A. vexans*, but *bl* with one strong bristle and four leaf-like processes.

LARVA (fig. 61, **a**–**d**).—Length about 7 mm., including siphon. which is slightly more than 1 mm. long. *Head* yellowish-brown, dorsum covered with numerous dark spots. Antenna pale ; shaft with spinelets, most numerous on basal ½ ; tuft of 5–6 branches arising near middle of shaft ; two apical spines articulated a very little below tip. Preclypeal spines slender and fairly long. Frontal hair *A* with 8–10 branches ; *B* single and stout ; *C* standing almost dirctly behind *B*, with 3–5 branches ; *d* very small, with about 4 fine branches, lying internal and almost level with *B* ; *e* single, fine, and fairly long. Mentum with 15–16 teeth on either side of central one. Lateral hairs on *thorax* and *abdomen* moderately developed. Comb of about 10 large teeth arranged in an irregular row. *Siphon* brown, about 2–3 times length of diameter at base ; surface covered with minute ridges ; a narrow black ring at base. Acus present. Pecten of 13–19 teeth, majority with 3 lateral denticles, the two or three distal teeth larger, more widely spaced, and without lateral denticles. Siphonal tuft very small, 3–5 branches, at ⅔ from base of tube. *Anal segment* very similar to that of *Aëdes pipersalatus* (see fig. 62). Papillæ about length of longest fan-hairs.

DISTRIBUTION.—BOMBAY DECCAN : type-locality *, as given above. S. INDIA : Somwarpet *, Coorg, vi. 1927 (*Baily*). MADRAS : Anamali Hills *, viii. 1928 (*Shaffi*).

Not known from elsewhere.

133. Aëdes (Aëdimorphus) cæcus (Theobald), 1901.

M.C. i, p. 413 (*Culex*) (♀). TYPE-LOC. : Selangor, Malay Penin., x. 1899 (*Butler*). TYPE : ♀ in Brit. Mus.

Culicada suknaensis Theobald †, 1910, Rec. Ind. Mus. iv, p. 21. TYPE-LOC. : Sukna, Darjeeling dist., 500′, vii. 1908 (*Annandale*). TYPE : ♀ in Ind. Mus.

ADULT ‡.—Resembles the *Aëdes vexans* group of species, but differs in having dark femora, without any speckling of pale scales, the anterior surface of the mid-femur particularly being entirely dark brown. Scutellum with lanceolate

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† [This was formerly quoted by Edwards as a synonym of *A. imprimens* Walk., but is, perhaps, more probably *A. cæcus*. The identity of *A. imprimens* is uncertain, as the ♂ has not been obtained from the type-locality (Amboina) ; in ornamentation the type ♀ of *A. imprimens* resembles *A. cæcus* and also *A.* (*Banksinella*) *brugi* Edw. of New Guinea ; the latter is possibly the ♂ of *A. imprimens.*]

‡ Theobald 1907, p. 268 (*Pecomyia*) ; Leicester 1908, p. 135 (*Geitonomyia*) ; Barraud 1928 *a*, pp. 663–4 (*cæcus* and *imprimens*) ; Borel 1928 *b*, p. 65.

white scales, sometimes on all lobes, in other specimens mainly on lateral lobes, scales on mid-lobe being narrower. Proboscis dark brown, with usually an indefinite pale area in middle on underside and sides. Palpi of ♂ longer than proboscis by about length of last segment; a pale area at base, a pale ring in middle of long segment, white scales dorsally at bases of last two segments, these two segments with tufts of brown hairs. Tarsal segments with narrow basal pale rings, and abdomen with narrow, straight, basal pale bands.

♂.—*Hypopygium* (fig. 59, **o**, **p**) : style swollen at apex, with subterminal appendage and finger-like projection. Coxite with small hairy lobe on inner surface.

LARVA † (fig. 61, **e**–**h**).—Resembles other known species of the subgenus in most details, but differs markedly in presence of a ring of spines round siphon near tip, and of a patch of similar spines at about middle of siphon on anterior surface.

HABITAT.—Natural pools in open jungle (*Barraud*).

DISTRIBUTION.—N. BENGAL : Sukna *, type-locality, as given above. E. BENGAL : Rangamati *, Chittagong Hill Tracts, ix. 1922 (*Barraud*). ASSAM : Dinapur * and Dibrugarh *, vii. & viii. 1922 (*Barraud*) ; Golaghat *, i. 1925 (*Barraud*). S.W. INDIA : Malabar Coast *, x. 1915 (*Khazan Chand*). BURMA : Rangoon *, 1930 (*Feegrade*).

Known also from MALAY PENINSULA, DUTCH EAST INDIES, and COCHIN CHINA.

134. **Aëdes (Aëdimorphus) pipersalatus** (Giles), 1901.

Giles, in Theobald, M.C. ii, p. 316 (*Stegomyia*) (♀ only). TYPE-LOC. : Gonda, U.P. TYPE : ♀ in Brit. Mus.

Pseudograbhamia maculata Theobald, 1905, Journ. Bomb. Nat. Hist. Soc. xvi, p. 243 (♂ & ♀). TYPE-LOC. : Galgamuwa, Ceylon (*Green*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT ‡.—This and the following species may be distinguished from others in the subgenus by speckling of light and dark scales on wings, proboscis, and legs. Rather small species. Wing 3–3·5 mm.

♀.—*Head* : dorsum covered with narrow white and brown scales intermixed, and numerous dark upright scales ; a small dark patch at each side and a larger patch of broad white scales lower down. Palpi brownish-black, with white-scaled tips. Proboscis dark brown sprinkled with pale scales. *Thorax* : mesonotum covered with dark brown scales, pale

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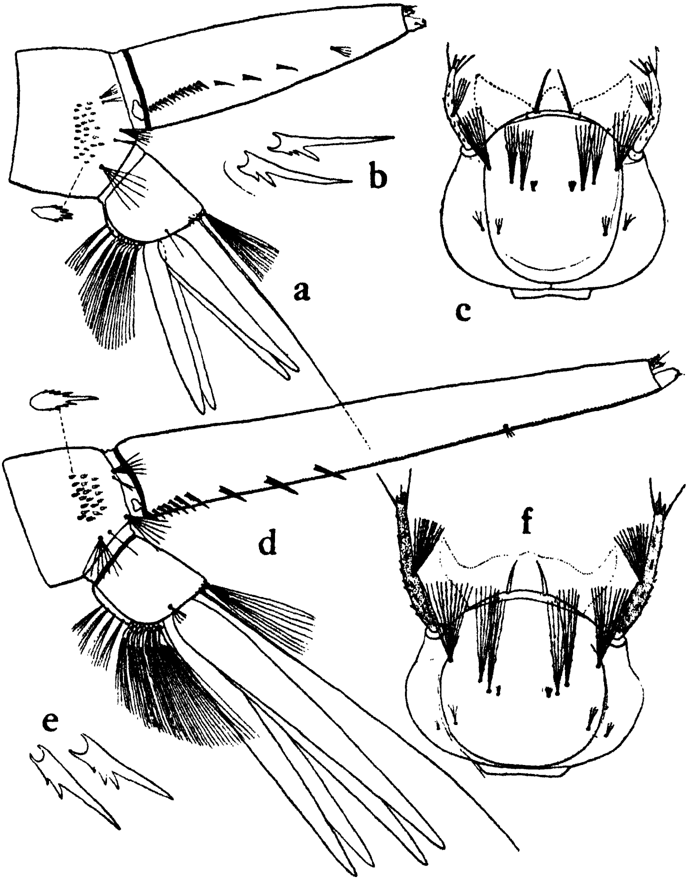
† Brug 1924 *a*, p. 436 ; Borel 1928 *b*, p. 65.

‡ Edwards 1913 *b*, p. 227 (*Ochlerotatus*, syn.) ; Barraud 1928 *a*, p. 664.

scales forming 6–8 roundish white spots, much more distinct in some specimens than in others; some pale scales along front and lateral margins, variable in extent, and around antescutellar space. Scutellar scales white and fairly broad on all three lobes; *apn* with narrow pale scales, *ppn* with both pale and brown narrow scales; some patches of fairly broad pale scales on pleuræ. *Wings*: evenly sprinkled with brownish-black and white scales. *Legs*: brownish-black; femur, tibia, and 1st tarsal segment of all legs plentifully sprinkled with pale scales; white markings at tips of femora

Fig. 62.



Larval structures of *Aëdes*, subgenus *Aëdimorphus*: **a–c**, *pipersalatus*; **d–f**, *pallidostriatus*.

and over tibio-tarsal joint. Tarsi with narrow basal pale rings to first three or four segments on fore and mid-legs, and to all segments of hind legs. *Abdomen* : dorsum almost black, with white basal bands on segments II–VI and lateral basal pale patches, longest on segments VI and VII. Sternites mainly pale scaled.

♂.—Palpi longer than proboscis by about length of last segment ; dark brown, speckled with pale scales ; a pale ring in middle of long segment and white scales at bases of last two segments. Tip of long segment and last two segments with long outstanding brown hairs. Antennal plumes dense, brown or yellowish according to direction of light. Markings as in ♀, but white spots on mesonotum usually faintly indicated, and speckling of wings less marked. *Hypopygium* : form of style as shown in fig. 59, **e**.

LARVA (fig. 62, **a**–**c**).—Length about 8 mm., including siphon, which is 1·25–1·75 mm. long. *Antenna* pale in colour, shaft with numerous spinelets ; hair-tuft at about middle of shaft with 8–10 frayed branches. Preclypeal spines long, moderately stout and dark. *Frontal hairs* placed as shown in fig. 62, **c**, all branched. Mentum with 13–14 teeth either side of central one. Lateral hairs of *thorax* and *abdomen* moderately developed. Comb of 20–30 fringed scale-like teeth in a patch. Subsiphonal tuft small. *Siphon* about 3 times length of diameter at base ; surface covered with minute ridges. Acus present. Pecten of 14–19 teeth ; the most distal two or three teeth widely spaced and without lateral denticles ; the more basal teeth close together and with lateral denticles. Siphonal hair-tuft quite small, with about 5 fine branches, inserted usually about midway between most distal pecten-tooth and apex of tube. *Anal segment* as in fig. 62, **a**.

HABITAT.—Ground-pools, water-filled ditches, etc.

DISTRIBUTION.—Common from NORTH-WEST INDIA as far east as BENGAL, and through PENINSULAR INDIA to CEYLON. There are no records from Assam or Burma, or from outside the Indian region.

135. **Aëdes (Aëdimorphus) tæniorhynchoides** (Christophers), 1911.

Paludism, no. 2, p. 68 (*Leslieomyia*) (♂ & ♀). TYPE-LOC. : Amritsar, Punjab, ix. 1910 (*Christophers*). TYPE : ♂ & ♀ in Brit. Mus.

Pecomyia maculata Theobald, 1905 (name preoccupied), Journ. Econ. Biol. i, p. 23 (♂ & ♀). TYPE-LOC. : India (*James & Christophers*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT *.—Very similar to *Aëdes pipersalatus*, but differs as follows :—Mesonotal scales lighter in colour, owing to presence of more numerous pale scales, which do not form spots. Scales on mid-lobe of scutellum mainly narrow.

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* Edwards 1913 *b*, p. 227 (*Ochlerotatus*, syn.) ; Barraud 1928 *a*, p. 665.

♂.—*Hypopygium* : style (fig. 59, f) of slightly different form to that of *A. pipersalatus*.

LARVA.—Unknown.

HABITAT.—Ground-pools, etc.

DISTRIBUTION.—PUNJAB and DELHI PROVINCE only.

136. Aëdes (Aëdimorphus) pallidostriatus (Theobald), 1907.

M.C. iv, p. 410 (*Culex*) (♂ & ♀). TYPE-LOC. : Peradeniya, Ceylon (*Green*), and India (*Christophers*). TYPE : ♂ & ♀ in Brit. Mus.

Culex parascelos Theobald, 1910, Rec. Ind. Mus. iv, p. 18 (♀). TYPE-LOC. : Madras Town, x. 1908 (*Hodgart.*). TYPE : ♀ in Ind. Mus.

ADULT *.—Belongs to a small group of medium-sized species with legs mainly yellow in posterior view, no rings on tarsi, and narrow scales on *ppn* and scutellum. Distinguished from other members of the group (described below) by striped femora and tibiæ †. Wing about 4 mm.

♀.—*Head* : scales nearly all yellow, numerous narrow and upright scales on vertex and nape, those at sides broader. Tori, clypeus, palpi, and proboscis yellow ; apical ¼ of proboscis dark brown, also larger part of flagellum of antenna. *Thorax* : integument brown, covered with narrow golden-brown and yellow scales, latter forming a pair of submedian lines from the front, running back to scutellum, and a lateral line on margin each side in front of wing-roots ; sometimes, also, a faintly indicated median line. Scutellar scales narrow, golden. Some patches of mostly rather narrow creamy scales on pleuræ. *Wings* : outer margin of costa yellow scaled from base to apex, otherwise scales are dark. *Legs* : femora, tibiæ, and one or more tarsal segments conspicuously striped longitudinally with pale scales in front (on anterior aspect), most marked on mid- and hind legs ; when viewed from behind, all legs are mainly yellow ; no definite pale rings on tarsi. *Abdomen* : completely covered with bright ochre-yellow scales, without bands or spots.

♂.—Palpi mainly yellow, longer than proboscis by about length of terminal segment ; last two segments turned downwards and with outstanding yellow hairs, similar hairs also at apex of long segment. Antennal plumes yellow. Other markings as in ♀, but stripes on legs often less marked. Abdomen with conspicuous lateral yellow hairs, and usually some brown scaling towards apical margins of tergites. *Hypopygium* : form of style as shown in fig. 59, **g**.

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* Edwards 1913 *b*, p. 228 (*Ochlerotatus*, syn.) ; Barraud 1928 *a*, p. 665.

† [The only other member of the group, apart from the four Indian species, is the African *A. ochraceus* Theo., which closely resembles *A. pallidostriatus* in both adult and larval stages, differing in the form of the ♂ style.]

LARVA (fig. 62, **d**–**f**).—Length 10–12 mm., including siphon, which is 2·5–3 mm. long. *Head* comparatively large. Antenna moderately long, dark brown or nearly black, usually lighter at base and tip ; shaft with numerous small strong spinelets ; hair-tuft of about 20 subplumose or frayed branches, rather nearer base than apex of shaft. Preclypeal spines moderately stout and long, tapering to a fine point. *Frontal hairs* placed as shown in fig. 62, **f**, all with a moderate number of branches. Mentum with 11–12 teeth either side of central one, basal teeth larger than apical. Lateral hairs on *thorax* and *abdomen* only moderately developed. Comb of about 20 teeth, each ending in a terminal spine and with a few strong lateral spines. *Siphon* very long, 6–7 times length of diameter at base ; pale brown or yellow ; surface covered with minute ridges ; a narrow black ring at base. Acus present, but small. Pecten of 9–13 teeth, the three most distal widely spaced and without lateral denticles. Hair-tuft very small, usually lying about mid-way between most distal pecten-tooth and apex of tube. Form of *anal segment* as shown in fig. 62, **d**.

HABITAT.—Open pools formed by rain or seepage ; water-filled dykes, ditches, borrow-pits, etc.

DISTRIBUTION.—A fairly common species from the PUNJAB to BENGAL and through PENINSULAR INDIA to CEYLON. There are no records from Assam or Burma, or from outside the Indian region.

137. **Aëdes (Aëdimorphus) nigrostriatus** Barraud, 1927.

Ind. Journ. Med. Res. xiv, p. 549 (♂ & ♀). TYPE-LOC. : Golaghat, Sibsagar dist., Assam, xi. 1925 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT *.—Distinguished by black stripes on thorax and black knee-spots. Wing-length 3·5–4·5 mm.

♀.—*Head* : covered with narrow bright yellow scales, numerous, rather narrow upright pale scales on vertex and nape, some broader yellow scales at sides. Tori, clypeus, palpi, and proboscis yellow or golden, labella and flagellum of antenna brown ; palpi nearly ⅓ length of proboscis. *Thorax* : mesonotal scales narrow and yellow, a pair of conspicuous submedian black stripes running from front margin back to lateral lobes of scutellum. A round black spot in front of each wing-root, which, in some specimens, is continuous with a dark marking running downwards across the pleuræ towards coxa of fore leg. Scutellar scales narrow and bright yellow. Postnotum pale yellowish or brownish, with a dark stripe on each side, corresponding with the dark stripes on mesonotum. Pleuræ pale yellow or brownish, with a dark marking commencing at postspiracular area and continued downwards towards fore coxa. Some small lanceolate scales on sternopleura, mesepimeron, and postspiracular area ; narrow yellow scales on *ppn*. *Wings* : scales yellow and black the latter on basal ½ of vein 1, on 2 and 4 from cross-veins to margin of wing, including branches, on 5 and 5.1. Membrane in region of cross-veins slightly darkened. *Legs* : yellow or golden, with black knee-spots to femora. In some specimens anterior surface of mid-femur is brownish. *Abdomen* : uniformly clothed with bright yellow scales.

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* Barraud 1928 *a*, p. 666.

♂.—Antennal plumes yellow. Palpi mainly yellow, longer than proboscis by about length of apical segment ; last two segments turned downwards and with tufts of yellow hairs ; a dark ring on long segment and dark scales at base and apex of penultimate segment and along length of last segment. Other details as in ♀. *Hypopygium* : style highly modified, as shown in fig. 59, l.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality * and from Rangoon *, BURMA, i. 1926 (*Hamilton Miller*), and 1930 (*Feegrade*).

138. **Aëdes (Aëdimorphus) mediolineatus** (Theobald), 1901.

M.C. ii, p. 113 (*Culex*) (♀). TYPE-LOC. : Thayetmyo, Burma (*Watson*). TYPE : ♀ in Brit. Mus.

Culex trilineatus Theobald, 1901, M.C. ii, p. 105 (♀) (name preoccupied). TYPE-LOC. Thayetmyo, Burma (*Watson*). TYPE : ♀ in Brit. Mus.

ADULT †.—Distinguished from the last two, especially by abdominal markings. Wing about 4 mm.

♀.—*Head* : very similar to that of *A. pallidostriatus*, but clypeus and palpi darker. *Thorax* : mesonotal scales yellowish-brown, with a pair of submedian pale yellow stripes running back from front to scutellum. Scutellar scales narrow, yellow. *Wings* : dark scaled. *Legs* : brown or yellow, according to angle at which they are seen, no definite stripes or bands. *Abdomen* : a pale ochre-yellow stripe down middle of dorsum, bordered on either side with dark brown, pale yellow again at sides.

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† Barraud 1928 *a*, p. 665 ; Borel 1928 *b*, p. 63.

♂.—Palpi yellowish, apex of long segment and last two segments brownish above, hair-tufts yellow, or brownish when viewed from side against a white background; penultimate segment slightly swollen; whole palp longer than proboscis by about length of last segment. Dorsum of abdomen with triangular dark area in middle of each tergite, with apex towards base of segment, yellow scales at sides. *Hypopygium*: style as in fig. 59, **b**.

LARVA *.—Not isolated in India. From description and figures by Borel appears to be very similar to *A. pallidostriatus*, and from the details given by him it is not possible to say in what respects the two larvæ may differ. The siphon in both is very long, from 5–7 times length of diameter at base.

DISTRIBUTION.—Known only from the type-locality as regards India. Recorded also from JAVA and COCHIN CHINA.

139. **Aëdes (Aëdimorphus) trimaculatus** (Theobald), 1905 †.

Ann. Mus. Nat. Hung. iii, p. 86 (*Culex*) (♀). TYPE-LOC.: Bombay, 1902 (*Biró*). TYPE: ♀ in Nat. Mus. Hungary, Buda Pest.

Aëdes (*Aëdimorphus*) *littoralis* Barraud, 1927, Ind. Journ. Med. Res. xiv, p. 551 (♂ & ♀). TYPE-LOC.: Trombay, Bombay Harbour, vii. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—Readily distinguished by colouring of thorax. Wing 3·5–4 mm.

♀.—*Head*: vertex and sides with broad pale scales, fairly numerous dark upright scales on vertex and nape, narrow golden scales along eye-margins. Palpi yellowish-brown, only about ⅙ length of proboscis, latter largely yellow on basal ⅔, especially beneath, dark brown apically. *Thorax*: integument of mesonotum pale at sides towards front, a median brown area, broad in front, gradually narrowing posteriorly, and continued to mid-lobe of scutellum; an oval dark area posteriorly on each side over wing-root; scales fairly dense but unusually small, golden and brown mixed. Scutellar scales narrow, golden on lateral lobes, dark brown at base of mid-lobe. *Wings*: dark scaled, except on subcosta, the scales on this vein being all yellowish. *Legs*: brown, yellowish when seen from behind; hind femur almost entirely yellow, except dorsally on anterior surface. *Abdomen*:

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* Borel 1928 *b*, p. 64.

† [The types of *trimaculatus* and *littoralis* being from the same locality, and agreeing in the rather remarkable thoracic markings, there seems little doubt that they are conspecific. The type ♀ of *littoralis* differs somewhat from Theobald's description in regard to abdominal markings, but these may well be variable.]

‡ Barraud 1928 *a*, p. 666.

almost entirely clothed dorsally with violet-black scales; sides of each tergite yellow from base to hind border, the yellowish area wider at base. [According to Theobald: abdomen dull brown, with basal dull yellow bands spreading out laterally.]

♂.—Antennal plumes yellowish. Palpi only slightly longer than proboscis; last two segments of about equal length, turned slightly downwards, and with tufts of brownish-yellow hairs; a tuft of hairs also at apex of long segment and a dark ring near middle; dark brown scales at apex and along the last two segments. *Abdomen* yellow scaled, with wide triangular violet-black apical bands on tergites II–IV, apex of triangle pointing towards base of each segment; narrower dark apical bands on I and V–VII. Sternites pale yellow, with faintly darker apical bands on terminal segments: *Hypopygium*: style (fig. 59, **a**) of unusually simple form, with an appendage projecting laterally at about middle.

LARVA.—Unknown.

DISTRIBUTION.—BOMBAY: type-locality *, as given above; Deolali *, Nasik dist., x. 1928 (Brit. Mil. Hosp.). SOUTH INDIA: Cannanore *, ix. 1929 (*M. O. T. Iyengar*).

Not known from elsewhere.

140. **Aëdes (Aëdimorphus) nummatus** Edwards, 1923.

Bull. Ent. Res. xiv, p. 4 (♂ & ♀). TYPE-LOC.: Meenglas, Jalpaiguri, N. Bengal, vii. 1922 (*M. O. T. Iyengar*). TYPE: ♂ in Brit. Mus.

ADULT †.—An aberrant species in markings and structure, differing from all others of subgenus in many respects. Wing about 3 mm.

♀.—*Head*: entirely clad with broad flat scales, mainly dark brown, but lighter brown scales forming a median line and a border to eyes. Tori, clypeus, palpi, and proboscis dark brown, the last rather slender and about length of fore femur; palpi about $\frac{1}{4}$ length of proboscis. *Thorax*: integument of mesonotum dark brown; a large, nearly round, silvery-white patch of narrow scales anteriorly, not quite reaching front margin, scales over remainder dark brown; bristles black, numerous, and long on posterior $\frac{1}{2}$ of mesonotum. Scutellar scales dark brown, narrow on lateral lobes, broad on mid-lobe. Narrow dark brown scales on *apn* and *ppn*, some patches of flat pale scales on pleuræ. *Wings*: dark scaled. *Legs*: dark brown, undersides of femora and tibiæ light; hind femur with basal $\frac{1}{2}$ almost entirely pale, also on anterior, or outer, side as far as knee, but no definite

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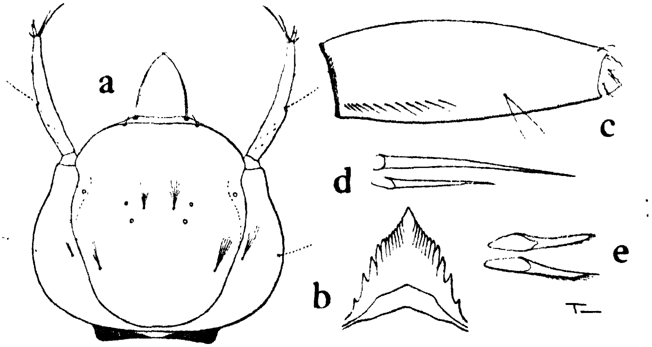
† Barraud 1928 *a*, p. 667.

knee-spots. *Abdomen*: dark brown dorsally, pale ventrally, not tapering towards extremity, segment VII being large, VIII not completely retractile, cerci comparatively short.

♂.—Differs from ♀ as follows:—Head-scales nearly all light brown. Palpi slender, about ½ length of proboscis, tips not swollen and with few hairs. Scales on mid-lobe of scutellum light brown. *Hypopygium*: style of very characteristic form (fig. 59, **i**) being divided into two prongs, one of which has a moderately large terminal, pointed appendage. Proctiger as in fig. 59, **h**.

LARVA (fig. 63).—Known only from one or two damaged skins, from which the following details can be made out:—*Head* light brown, antennæ darker. Antennal shaft moderately long, curved, and fairly stout, thickest in middle and tapering to tip; surface smooth, with very few minute spinelets; hair-tuft missing, point of attachment at about middle of shaft on outer side. Preclypeal spines long and slender. Frontal hairs missing, except *d* on one side. *B*, *C*, and *d* placed rather far back, apparently at about middle of clypeus; point of origin of *C* slightly posterior and internal to *B*; *d* internal to, and in transverse line with, *B*, of moderate size, with about 12 fine branches. Mentum with 5–6 large teeth on either side towards base and 6–7 smaller teeth between these and a large central tooth. Mouth-brushes normal. Lateral hairs on *thorax* and *abdomen* moderately developed. Comb of about 24 fairly large pointed teeth. *Siphon* widest in middle and tapering slightly to base and apex, surface covered with minute ridges; length about 1 mm. and about 3 times length of diameter at base. Pecten extending along

Fig. 63.



Larval structures of *Aëdes* (*Aëdimorphus*) *nummatus*: **a**, head; **b**, mentum; **c**, siphon; **d**, pecten-teeth; **e**, comb-teeth.

basal ½ of siphon, of about 12 very long slender teeth, fringed from near base to tip along one side; distal teeth only slightly more widely spaced than those nearer base. Hair-tuft at ⅗ length of siphon from base, of 2–4 fairly long fine branches. *Anal segment* enclosed, except ventrally, within chitinisation; *isc* of 2 branches, one much longer than the other; *lh* of 3–4 moderately long fine branches. Fan-hairs fairly long (many missing), arising from fan-plate.

HABITAT.—Tree-holes and bamboos. Larvæ once found in water in broken bottle in jungle.

DISTRIBUTION.—N. BENGAL: Meenglas, type-locality, as given above; Sukna *, Darjeeling dist., 500′, ix. 1922 (*Barraud*). ASSAM: Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*); Haflong *, Cachar Hills, viii. 1922 (*Barraud*).

141. **Aëdes (? Aëdimorphus) ostentatio** (Leicester), 1908 †.

Cul. Malaya, p. 193 (*Aioretomyia*) (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

Pseudohowardina chrysoscuta Theobald, 1901, M.C. v, p. 228 (♀). TYPE-LOC.: Peradeniya, Ceylon, iv. 1907 (*Green*). TYPE: ♀ in Brit. Mus.

Danielsia pagei Ludlow, 1911, Psyche, xviii, p. 128 (♀). TYPE-LOC.: Fort Pikit, Mindanão, Philippine Is. TYPE: ♀ in U.S. Nat. Mus.

ADULT ‡.—Rather small species, with dark legs and median golden line on thorax. Wing about 3 mm.

♀.—*Head*: a wide patch of narrow golden and pale upright scales on vertex and nape, flanked by large areas of flat black scales; alternating lateral patches of yellow and black scales. Tori pale yellow. Clypeus, palpi, and proboscis brownish-black; labella lighter; palpi rather thin and about ⅕ length of proboscis. *Thorax*: mesonotum with a central stripe of narrow golden scales, wider in some specimens than in others; a broad border of similar scales round front margin, continued laterally and bending inwards in front of wing-roots; a small collection of similar scales over wing-root; remainder of mesonotum covered with dark brown narrow scales. Scutellar scales narrow, golden; *apn* rather heavily clothed with flat blackish-brown scales; *ppn* nearly bare, with dark scales on upper part. Two patches of broad white flat scales on sternopleura, and a small one on mesepimeron. *Wings*: heavily scaled with rather broad scales. *Legs*: brownish-black, femora paler beneath, and with very small pale knee-spots. *Abdomen* : brownish-black, with large lateral pearly-white markings, continued over the dorsum as narrow basal bands on II–VII ; VIII retracted within VII ; cerci long and projecting from VII.

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† Until the ♂ has been discovered it is not certain whether this species is correctly placed in this subgenus.

‡ Edwards 1913 *b*, p. 228 (*Ochlerotatus*, syn.); 1922 *d*, p. 468 (syn.); Barraud 1928 *b*, p. 374.

♂ and LARVA.—Unknown.

LARVAL HABITAT.—Pool in jungle (*Leicester*).

DISTRIBUTION.—MALABAR COAST *, x. 1915 (*Khazan Chand*). CEYLON : Peradeniya (type-locality of *P. chrysoscuta*, as given above) ; Bibile, vii. 1929 (*G. M. Henry*).

Also known from MALAYA, BORNEO, and PHILIPPINE IS.

Subgenus **INDUSIUS**, subg. n.†

142. **Aëdes (Indusius) pulverulentus** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 273 (♀). TYPE-LOC. : Nowshera, Peshawar dist., N.W. India, vi. 1911 (*Smith*). TYPE : ♀ in Brit. Mus.

ADULT ‡.—Small, thick-set species with flat-scaled head, but without any distinctive ornamentation. Wing 2·5–3 mm.

♀.—*Head* : entirely covered with broad flat scales, those on vertex grey or dull white, patches of brown ones at sides. Palpi and proboscis brown, latter with sprinkling of pale scales in some specimens ; palpi nearly ¼ length of proboscis, latter about length of the rather short fore femur. *Thorax* : mesonotum very densely covered with light yellow or fawn narrow scales ; bristles only present on front margin, in front of scutellum, and over wing-roots. Scutellum with flat scales on mid-lobe, dark at base, light at apex ; pale narrower scales on lateral lobes. Some dark brown narrow scales on upper part of *ppn*, paler ones below and on *apn*. Sternopleura with patches of broad flat white scales, mesepimeron with one similar patch. Bristles on *ppn* and upper part of mesepimeron fairly numerous (10–12), no lower mesepimeral. *Wings* : costa dark, with sprinkling of pale scales, other veins for the most part covered with dull creamy scales. *Legs* : rather short and thick ; femora and tibiæ pale scaled, without definite markings, but with sprinkling of dark scales ; tarsi darker, with, in some specimens, indefinite basal pale rings on first three segments ; hind tibiæ unusually bristly. *Abdomen* : dorsum dark greyish-brown or dark brown, with basal creamy bands, widening out at sides, on II–VII. In some specimens V–VII mainly pale scaled. Segment VIII usually retracted within VII ; cerci long and projecting from VII. Sternites pale scaled.

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† [For definition of this new subgenus, *vide* Appendix.]

‡ Barraud 1928 *b*, p. 374.

♂ (?).—Two specimens from Dera Ismail Khan in the Central Research Institute collection, Kasauli, may possibly belong to this species. Although both are completely denuded of scales, they are briefly described here because of some remarkable peculiarities of structure which distinguish them from all other species of *Aëdes*. *Proboscis* short and thick, somewhat swollen before the labella. *Palpi* equal in length to proboscis, slightly swollen apically. *Front tarsi* unusually short and thick, segment 2 scarcely more than twice as long as broad and shorter than 5, 3 and 4 each only slightly longer than broad, and together barely as long as 5, hairy beneath and with a pair of strong apical ventral spines ; claws equal, simple, and as long as segment 5 or longer ; empodium as long as claws and feathery. *Hypopygium* large and of unusual form ; style broad and without appendage ; a long, simple, curved process arising from proctiger or base of coxite.

LARVA.—Unknown.

DISTRIBUTION.—INDUS VALLEY only : Nowshera *, type-locality, as given above ; Karachi *, viii. 1926 (C.M.B. records) ; Mari Indus *, vii. 1927 (C.M.B. records) ; Larkana *, Sind, x. 1927 (*Abdul Majid*) ; Dera Ismail Khan * (♂ described above).

Subgenus **BANKSINELLA** Theobald, 1907.

M.C. iv, p. 468. Genotype, *B. luteolateralis* Theo.

This subgenus is represented by only one species in India. It may be recognized by the characters given in the Key to Subgenera and in the following description. The females readily attack man, particularly at dusk. *A. lineatopennis* and six other species occur in Africa, and one other in Papua.

143. **Aëdes (Banksinella) lineatopennis** (Ludlow), 1905.

Can. Ent. xxxvii, p. 133 (*Tæniorhynchus*) (♀). TYPE-LOC. : Luzon, Philippine Is. TYPE : ♀ in U.S. Nat. Mus.

Culex luteolateralis Theobald, 1901, M.C. ii, p. 71 (in part).

ADULT ♀ †.—General coloration dark brown. Sides of mesonotum conspicuously yellow scaled. Legs dark brown, unbanded. Wings with pale yellow scales on vein 1 and stem of vein 5. Abdomen with pale yellow basal bands. These characters are sufficient to distinguish this species from any other Indian mosquito ; the only one with which it might be confused is *Ficalbia chamberlaini* (Ludl.), which has lateral yellow markings on the mesonotum, but has pale rings on hind tarsi.

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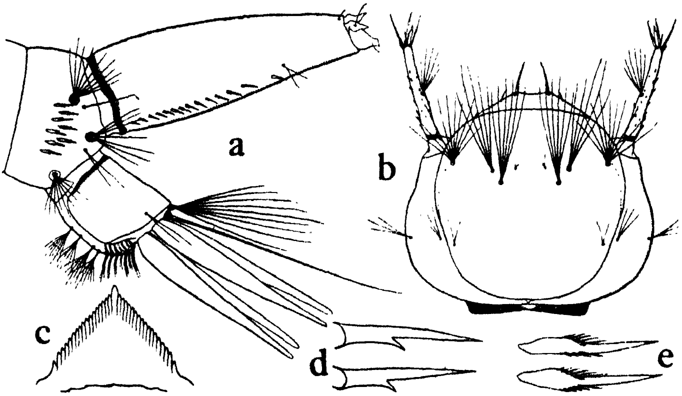
† Leicester 1908, p. 160 (*Culex luteolateralis*) ; Edwards 1915 *a*, p. 274 ; 1924, p. 371 ; Barraud 1928 *a*, p. 668.

♂.—Resembles ♀ in markings. Palpi apparently of only two segments, longer than proboscis by nearly length of 2nd segment, this being upturned and hairy. Antennæ with dense plume-hairs projecting chiefly from dorsal and ventral sides of shaft. *Hypopygium* (fig. 59, **k**): coxite fairly long, with numerous hairs on inner surface and with a projecting basal lobe carrying several strong spines. Style articulated below apex of coxite, short, widened in middle, and with a fairly long terminal appendage. Phallosome with toothed lateral plates, as in *Aëdimorphus*. Paraprocts terminating in a blunt point.

LARVA * (fig. 64).—*Head* moderately chitinised; antenna dark brown, with strong spicules along length of shaft, and a hair with several fairly long branches at about middle. Frontal hairs *A*, *B*, and *C* about equally developed, each with a moderate number of fairly long branches, these three pairs forming a concave row a little posterior to level of bases of antennæ. Hair *d* very small, internal to other three pairs, and about level with *B*. Preclypeal spines slender, pale, tapering to a fine point. Hairs of mouth-brushes simple. Mentum triangular, with numerous small teeth. Lateral hairs of *thorax* and *abdomen* moderately well developed. Comb of 6–8 large sharply-pointed teeth, fringed with hairs at bases, irregularly arranged. *Siphon* about 1 mm. long. Pecten extending along rather more than basal ½ of siphon, of 12–16 teeth, the two or three furthest from base more widely

Fig. 64.



Larval structures of *Aëdes* (*Banksinella*) *lineatopennis*: **a**, tail-end; **b**, head; **c**, mentum; **d**, pecten-teeth; **e**, comb-teeth.

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* Ingram & de Meillon 1927, p. 61.

spaced than those in main rank ; each tooth with a long thin point, and one or two lateral denticles (most distal tooth apparently simple in some specimens). Hair-tuft small, of 5–8 short branches, attached slightly nearer apex of siphon than most distal pecten-tooth. *Anal segment* enclosed, except ventrally, within chitinisation ; *lh* single, fine, and fairly long ; *isc* of about 8 fairly long subequal branches, *osc* single and long. Fan of moderate size, 4–5 small branched hairs arising from membrane between fan-plate and base of segment. Papillæ very long, narrow, and pointed.

HABITAT.—Open natural pools.

DISTRIBUTION.—Widely spread from the PUNJAB to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON and ANDAMANS.

Also known from AFRICA, MALAYA, PHILIPPINES, and AUSTRALIA.

Subgenus **DICEROMYIA** Theobald, 1911.

4th Rept. Wellc. Res. Lab. p. 151. Genotype, *D. africana* Theo.

Dendroskusea Edwards, 1929, Bull. Ent. Res. xx, p. 341. Genotype, *Culex micropterus* Giles.

ADULT.—Rather small, dark mosquitoes, without conspicuous ornamentation on mesonotum, but with two white bands on head either side of middle line. Vertex of head, *ppn*, and scutellum with broad flat scales. Proboscis about length of fore femur. Palpi of ♂ about length of proboscis, terminal segments short, somewhat thickened, hairy, and turned downwards. Antennæ of ♂ as in *Aëdimorphus*. Mesonotal bristles very strong and numerous. Usually one or more lower mesepimeral bristles. Tarsal claws of ♀ all simple. Segment VIII of ♀ abdomen not completely retractile ; cerci short and fairly broad. Coxite of ♂ hypopygium without definite lobes ; style simple, with terminal, or subterminal, appendage ; harpago absent ; phallosome divided into lateral plates, with teeth, as in *Aëdimorphus*. The chief distinctions from the last-mentioned are to be found in the simple tarsal claws of ♀, presence of broad flat scales on *ppn* and of lower mesepimeral bristles (except in *periskeletus*), in the form of the terminal segments of abdomen of ♀, and of the style of ♂ hypopygium.

LARVA.—Resembles those of subgenus *Stegomyia*, as far as known, but comb-teeth are usually blunt-edged and fringed, and pecten-teeth have lateral denticles along one side for whole length.

DISTRIBUTION and BIONOMICS.—Five species are known from the Indian region, four being confined to that area, the fifth having been recorded from Java also. Four other species are confined to Africa. So far as is known the early stages are passed in tree-holes and bamboo-stumps. Nothing appears to be known of the habits of the adults.

Key to Adults.

1.	Femora with preapical pale rings	2.
	Femora without preapical pale rings	4.
2.	Fore and mid-tibiæ spotted in front (on anterior aspect); 1st hind tarsal segment with pale ring in middle	3.
	Fore and mid-tibiæ not spotted in front; 1st hind tarsal segment without pale ring in middle	*periskeletus*, p. 272.
3.	Abdomen with some round white admedian spots on dorsum	*iyengari*, p. 273.
	Abdomen without white round spots on dorsum	*punctipes*, p. 273.
4.	Pleuræ dark	*micropterus*, p. 275.
	Pleuræ pale ochreous	*reginæ*, p. 277.

144. **Aëdes (Diceromyia) periskeletus** (Giles), 1902.

Handbook, 2nd ed. p. 371 (*Stegomyia*) (♂). TYPE-LOC.: Shahjahanpur, x. (*Giles*). TYPE: lost.

Ochlerotatus annulifemur Edwards, 1914, Bull. Ent. Res. v, p. 77 (♂). TYPE-LOC.: Jhansi, Central India, viii. 1900 (*Giles*). TYPE: ♂ in Brit. Mus.

ADULT ♂ [*].—No specimens of this are available for re-description; none have apparently been obtained during the past thirty years, which seems remarkable, as a good deal of collecting has been done in the north of India.

The following details are taken from Edwards's description of *O. annulifemur*:—*Head*: clothed with broad flat scales, white at sides, black above, except for a white stripe either side of middle line. Proboscis dark brown, with narrow white ring in middle. Palpi longer than proboscis by length of last segment; dark brown, except last segment, which is pale. *Thorax*: mesonotal scales dark brown, except for some lighter scales on front margin and in front of wing-roots. Some flat white scales on scutellum (mostly denuded). *Abdomen*: black, with white basal lateral patches. *Legs*: brownish-black; preapical white rings on femora. All femora and tibiæ narrowly white at tips, and all tarsal segments narrowly white at both ends. *Wings*: scales brown, a few white ones near base of subcosta.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-localities given above.

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[*] **Barraud 1928 *b*, p. 360 (*A.* (*Skusea*)).**

145. **Aëdes (Diceromyia) punctipes** Edwards, 1921.

Bull. Ent. Res. xii, p. 77 (*Aëdes* (*Skusea*)) (♀). TYPE-LOC.: Maymyo, Upper Burma, xii. 1913 (*Bennett*). TYPE: ♀ in Ind. Mus.

ADULT ♀ *.—*Head*: two patches, or bands, of pale scales on vertex, and another pale patch each side laterally. Palpi and proboscis dark brown. *Thorax*: mesonotal scales light bronzy-brown, some lighter ones on front margin. Scutellar scales broad, flat, brownish-black, some similar scales anterior to scutellum and over wing-roots. *Wings*: densely clothed with dark brown scales, some pale scales at bases of costa and vein 5. *Legs*: preapical pale rings and pale knee-spots to all femora; a small pale marking basal to ring on fore and mid-femora. Pale scaling over tibio-tarsal joints; fore tibia with three, mid- and hind tibiæ with four, small pale spots, evenly spaced, not forming rings. Fore tarsi with pale spot at joint between segments 1 and 2; similar markings on mid- and hind legs and at following joint; segment 1 of mid-tarsi with pale medial spot, a pale ring on hind tarsi in same position. *Abdomen*: tergite I with large pale patch in middle and one at each side; II–V with pale lateral patches which are not quite basal, otherwise dorsum is dark brown.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Type-locality only. Type ♀ examined by author.

146. **Aëdes (Diceromyia) iyengari** Edwards, 1923.

Bull. Ent. Res. xiv, p. 4 (*Aëdes* (*Skusea*)) (♀). TYPE-LOC.: Meenglas, Jalpaiguri, vi. & viii. 1921 (*M. O. T. Iyengar*). TYPE: one cotype ♀ in Brit. Mus.; one in Iyengar coll., Calcutta.

Aëdes (*Skusea*) *punctissimus* Barraud, 1928, Ind. Journ. Med. Res. xvi, p. 360 (♂ & ♀). TYPE-LOC.: Karwar, N. Kanara, ix. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀ †. *Head*: flat-scaled, a very few upright scales on nape; two patches, or bands, of pale scales on vertex, well separated by central dark area, another pale patch each side laterally. Palpi and proboscis dark brown. *Thorax*: mesonotal scales dark brown, with some paler ones intermixed, and a pale border to front margin. Scutellar scales as in *A.* (*D.*) *punctipes*. Broad pale scales on *apn*, and a broad line of flat white scales running from this across pleuræ to upper part of mesepimeron; a small patch of similar scales on *ppn*, and one on lower part of sternopleura. Two lower mesepimeral bristles. *Wings*: scales dark brown and dense: some pale scales at extreme base of costa. *Legs*: dark

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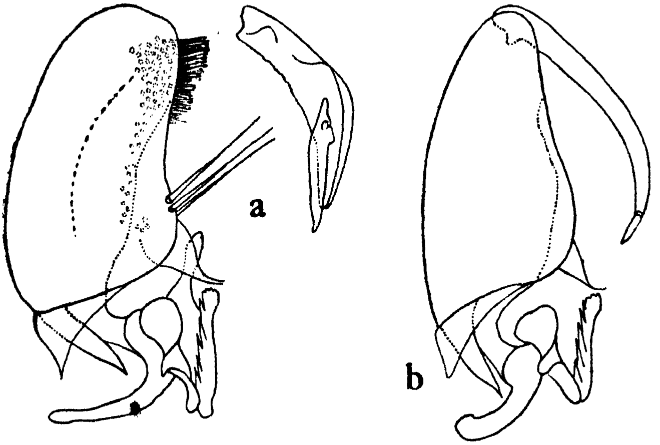
* Barraud 1928 *b*, p. 359 (*A.* (*Skusea*)).

† Barraud 1928 *b*, p. 360 (*A.* (*Skusea*)).

brown, with creamy or white markings. Femora with preapical pale rings, a row of 3–4 spots basal to ring anteriorly, and small pale knee-spots. Tibiæ with about six pale markings, some not forming rings, and pale scaling over tibio-tarsal joints. Segment 1 of tarsi of all legs with two pale markings on middle $\frac{1}{3}$, not forming rings, and a few pale scales at tip; remaining segments dark brown. *Abdomen*: dark brown, with pale markings. Tergite I with patch of pale scales on apical border in middle and large lateral silvery patches; II with lateral pale markings curving on to dorsum and meeting at base in middle line; also a pair of admedian round white spots near apical border; III–VII each with a pair of similar spots, and small lateral white markings, not visible dorsally.

Fig. 65.



♂ hypopygium of *Aëdes*, subgenus *Diceromyia*: **a**, *iyengari* (with style detached); **b**, *micropterus*.

Sternites with basal pale bands. In some specimens, including the two co-type ♀♀ of *iyengari*, the round white spots are absent from tergites II–IV and VII. Various intermediate specimens have since been obtained.

♂.—Differs from ♀ as follows:—Palpi about length of proboscis, tips slightly turned downwards and moderately hairy; a pale ring in middle of long segment, and pale markings at bases of last two segments. Proboscis dark brown, with narrow white ring at about middle. Antennal plumes directed chiefly dorsally and ventrally. Mid- and hind legs with a few pale scales at tips of tarsal segments 2 and 3. *Hypopygium* (fig. 65, **a**): coxite with dense patch of hooked hairs towards apex, internally. Style with large appendage, articulated some distance from apex.

LARVA †.—[Not known in India; two skins from Java presented by Col. Brug to the British Museum show the following characters:—*Antenna* rather shorter than in *micropterus*, scarcely tapering, about 6 times as long as broad. *Frontal hairs* as in *micropterus*, except that *B* is double. Dorsal hairs on *thorax* and *abdomen* small and inconspicuous. Mesopleural and metapleural tubercles alike, smaller than in *micropterus*, each with a very short spine. Comb much as in *micropterus*. *Siphon* longer than in *micropterus* (2–2½ times as long as breadth at base); pecten-teeth variable in number (6–14), fringed along one side and at tip, but apparently not so broad as in *micropterus*. Siphonal hair single, at middle of tube. *Anal segment* with moderately large saddle, with posterior edge smooth; *lh* single, at lower corner of saddle; *isc* 6-branched. Papillæ long and thick, about 3 times as long as segment, with rounded ends.]

HABITAT.—Bamboo-stumps.

DISTRIBUTION.—Type-localities, as given above. N. BENGAL: Sukna *, Darjeeling dist., 500′, viii. 1928 (*Puri*). S. BENGAL: Calcutta *, Matiabruz, Garden Reach, x. 1931 (*Senior-White*). BURMA: Rangoon *, 1930 (*Feegrade*).

Recorded also from JAVA (*Brug*).

147. **Aëdes (Diceromyia) micropterus** (Giles), 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 609 (*Culex*) (♂ & ♀). TYPE-LOC.: Allahabad and Lucknow (*Giles*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀ ‡.—*Head*: marked with 4 pale stripes alternating with 3 dark spaces; scales mainly flat, but numerous upright scales on nape, some extending forwards on to vertex. Palpi and proboscis brownish-black. *Thorax*: mesonotal scales deep brown, with lighter scales intermixed, not forming a definite ornamentation; bristles fairly numerous and strong. Scutellar scales broad, flat, deep brown or black. Pleuræ dark brown; 4–6 large *ppn* bristles; about 10 upper mesepimeral and 3 lower. *Wings*: dark scaled, short. *Legs*: dark brown, slightly paler on undersides and at tips of femora, also at tips of tibiæ. *Abdomen*: brownish-black; pale hairs along apical margin of each tergite, and small lateral pale patches; sternites narrowly pale at base.

♂.—Markings as in ♀. Palpi longer than proboscis by about length of short terminal segment, last two segment turned downwards, and with outstanding hairs. Antennal plumes brownish or yellowish. *Hypopygium* (fig. 65, **b**): coxite densely clothed with scales on outer side, numerous hairs along dorsal border; inner surface with small hairy lobe. Style rather long, slightly tapering, with terminal appendage. Phallosome divided into lateral plates, with teeth. Paraproct without teeth or small hairs at crown.

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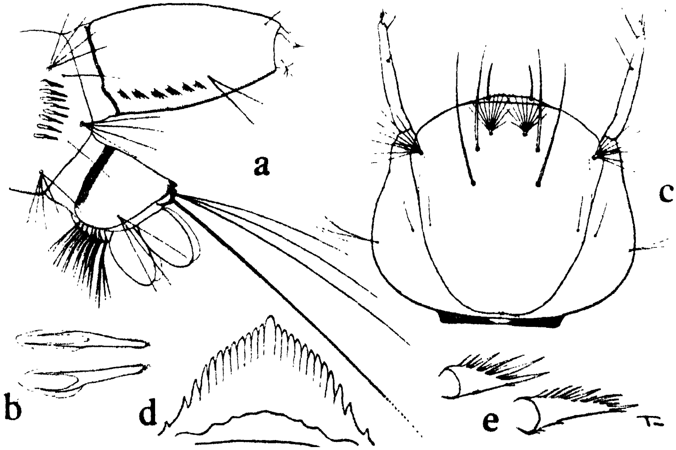
† **Brug 1932, p. 76.** ‡ **Barraud 1928 *b*, p. 358 (*A.* (*Skusea*)).**

LARVA (fig. 66).—*Head* and antenna moderately chitinised; latter long, somewhat tapering, with smooth shaft, and single hair on outer side, at about ⅔ from base. Frontal hairs *A*, *B*, and *d* in transverse line at about level of bases of antennæ: *A* with 6–8 branches; *B* single; *d* fairly large, with about 12 fine branches; *C* single, standing almost directly behind but at some distance from *B*. Preclypeal spines fairly long and slender. Mouth-brushes rather small, hairs of *thorax* and *abdomen* moderately developed. Some hairs on dorsum of stellate form, with fairly short branches, usually fine, but stronger in some specimens, number of branches varying from 4–8, even among specimens from the same batch. [Mesopleural tubercle rather large, with one long sharp spine; metapleural tubercle smaller, spine much shorter and quite inconspicuous.] Comb of 5–8 large teeth in a single row, each tooth ending in a blunt fringed tip. *Siphon* short and broad, usually almost black, 0·5–0·8 mm. long. No acus. Pecten of 5–8 short strong teeth, with lateral denticles from base to tip along one side; in some specimens denticles can be seen along both sides of one or more teeth. Hair-tuft of usually only 2 branches, beyond middle point of tube from base. A fairly large chitinised

Fig. 66.



Larval structures of *Aëdes* (*Diceromyia*) *micropterus*: **a**, tail-end; **b**, comb-teeth; **c**, head; **d**, mentum; **e**, pecten-teeth.

saddle covering larger part of *anal segment*; *lh* of 3 strong branches; *isc* of 3 branches. Fan of about 10 hairs arising from fan-plate, each hair split into 2–3 branches, longest of which are about length of *isc*. Ventral pair of papillæ about length of segment; dorsal pair about twice this length or more; both pairs with rounded ends.

HABITAT.—Tree-holes.

DISTRIBUTION.—Common in the PUNJAB and as far east as BIHAR (Pusa), and southwards to ORISSA and through WESTERN INDIA to MADRAS. So far as is known it is absent from Bengal, Assam, and Burma.

Not recorded from elsewhere.

148. **Aëdes (Diceromyia) reginæ** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 272 (*A.* (*Skusea*)) (♂ & ♀). TYPE-LOC.: Colombo, Ceylon, 1913 (*James*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Differs from *A.* (*D.*) *micropterus* as follows:—Pleuræ and coxæ pale ochreous instead of dark brown, contrasting with darker mesonotum. Fewer white scales on pleuræ.

♂.—*Hypopygium*: coxites with more numerous bristles on outer sides.

LARVA.—A few skins available, received many years ago from Col. James, from Ceylon, closely resemble *A.* (*D.*) *micropterus*. The chief difference appears to be in the mouth-brushes, the hairs of which are stronger; the median series somewhat hooked and minutely serrated. [Chitinised plate of mesopleural tubercle larger; metapleural tubercle apparently without spine. Dorsal hairs of thorax and abdomen with only 3–4 fine branches; *isc* with 6 branches.]

HABITAT.—Tree-holes.

DISTRIBUTION.—Known only from type-locality, and from Kharghpur *, Bengal-Nagpur Rly., 26. vii. 32 (*Senior-White*).

Subgenus **AËDES** Meigen, 1818 (s. str.).

Syst. Beschr. i, p. 13. Genotype, *A. cinereus* Mg.

Verrallina Theobald, 1903, M.C. iii, p. 295. Genotype, *Aëdes butleri* Theo.

Neomacleaya Theobald, 1907, M.C. iv, p. 238. Genotype, *N. indica* Theo.

Aioretomyia Leicester, 1908, Cul. Malaya, p. 185. Genotype, *A. varietas* Leic.

ADULT ‡.—Small or medium sized, dark brown or reddish-brown mosquitoes, with little or no ornamentation. The majority have lateral pale markings on the abdomen, and

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† Barraud 1928 *b*, p. 359 (*A.* (*Skusea*)).

‡ Barraud 1928 *b*, p. 363; Edwards 1932, p. 174.

in a few these are produced on to the dorsum to form transverse bands on one or more segments. Head entirely or mainly flat scaled; palpi very short in both sexes. Antennæ of ♂ with the hairs evenly spread round the segments. Proboscis about length of fore femur or slightly longer. Scutellar scales always narrow, those on *apn* also narrow, if any present. Tarsi always entirely dark. Claws of fore and mid-tarsi of ♀ toothed (in Indian species). Many species resemble one another so closely that identification can only be made with certainty by examination of the hypopygial structures. These are remarkably specialized in both sexes, and apparently quite different from those of any other genus or subgenus. In the ♂ the tip of the abdomen appears slightly swollen. The coxites are comparatively small and of remarkable form, as shown in the accompanying figures. Style articulated some distance below the apex of coxite, latter often with a process arising from inner side, or from dorsal or ventral borders; in some there are spines at ventral root. Chitinisations of proctiger (paraprocts) well developed and horn-like, sometimes forked. Phallosome usually with chitinisations, but without small teeth. In the ♀ segment VIII is partially retractile, and cerci of moderate length. The cowl, postgenital plate, spermathecal eminence, and atrial plates differ in form in various species, all these being usually heavily chitinised. Anterior lip of atrium usually membranous; insula not well developed.

LARVA.—Those of only two Indian species are at present known; they resemble those of the subgenus *Aëdimorphus*.

DISTRIBUTION and BIONOMICS.—The subgenus is chiefly Oriental; only a few species occur in the north temperate zone and in Australia; none known from Africa or Tropical America. About 40 species in all are known, 20 of these being found in the Indian region, the majority of which have been described in recent years. Little is known of the habits of the adults, but some of the commoner species attack man. Many appear to have a restricted distribution, and there is little doubt that further, as yet undescribed, species exist. So far as is known the larvæ live in open pools, water-filled ditches, or in mangrove swamps.

Key to Adults.

♂♂.

1.	**Tarsal claws of hind legs toothed; abdomen without any pale lateral patches on segments II–VII.**	*uniformis*, p. 281.
	Tarsal claws of hind legs simple; abdomen with lateral pale patches or pale transverse bands	2.

2.	Paraprocts forked, or divided into two arms	3.
	Paraprocts not forked nor divided	5.
3.	Paraprocts divided into two pointed processes of different lengths	4.
	Paraprocts divided into two arms, both truncated and slightly clubbed	*clavatus*, p. 294.
4.	Style truncated at tip, with subterminal hair; shorter processes of paraproct internal to longer	*pseudomediofasciatus*, [p. 286.
	Style pointed, with a hair some distance from tip; shorter process of paraproct external to longer	*cautus*, p. 288.
5.	Paraprocts long and pointed	6.
	Paraprocts short and rounded	10.
6.	A group of 4 or more spines at ventral root of coxite; tip of latter drawn out into several horn-like processes	7.
	No spines at ventral root of coxite; tip of latter with not more than a single process	8.
7.	Style comparatively long and sinuous, with two small subterminal hairs	*andamanensis*, p. 290.
	Style comparatively short and wide, with a long hair at about middle	*vallistris*, p. 290.
8.	Coxite without processes on inner side, but with large tergal lobe	*yerburyi*, p. 293.
	Coxite with one or two processes on inner side, but no tergal lobe	9.
9.	A single elbowed process (apart from the style) arising from inner side of coxite; apex of coxite wide and truncate	*indicus*, p. 283.
	Two straight processes (apart from the style) arising from inner side of coxite; apex of coxite terminating in a single pointed process	*rami*, p. 295.
10.	Paraprocts very small; coxite terminating dorsally in two long arms, one bearing 4 spines	*hirsutipleura*, p. 291.
	Paraprocts very small; coxite terminating in two curved points; sternite with a pair of terminal processes	*ceylonicus*, p. 288.
	Paraprocts very small; coxite with one arm; style deeply trifid	*butleri*, p. 296.
	Paraprocts comparatively very wide (other details unknown; hypopygium of type ♂ damaged)	*pseudodiurnus*, p. 295.

♀♀.

1.	Abdomen without any lateral pale marking on II–VII	*uniformis*, p. 281.
	Abdomen with lateral pale markings or pale transverse bands	2.
2.	*apn* covered with silvery-white scales	*yusafi*, p. 282.
	apn not so covered	3.
3.	Tarsal claws of hind legs toothed	*abditus*, p. 282.
	Tarsal claws of hind legs simple	4.

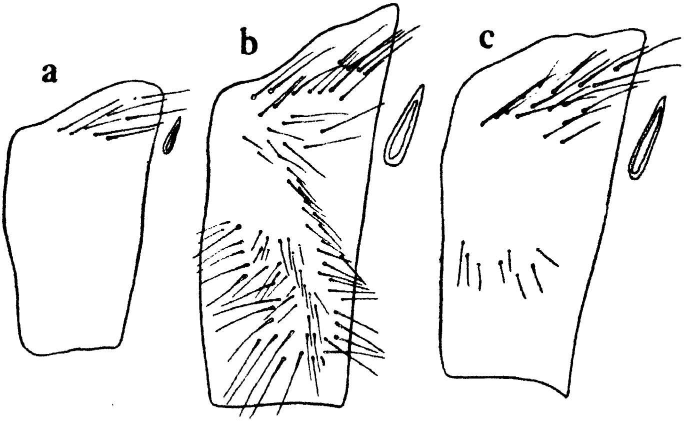
4. Abdominal tergites marked with one or more complete pale bands .... 5.
   Abdominal tergites marked with lateral pale patches not forming complete bands. 6.
5. Tergites II–IV marked with complete pale bands ; cowl markedly curved, with wide chitinised lip ; brownish species of moderate size .... *indicus*, p. 283.
   Tergite II only marked with a complete pale band, following segments with small lateral pale patches ; cowl not markedly curved, membranous in middle, and without a wide chitinised lip ; smaller blackish species .... *lugubris*, p. 294.
6. Numerous rather long hairs covering larger part of mesepimeron, especially lower ½ . 7.
   Hairs on mesepimeron less numerous, none on lower ⅓ of this sclerite .... 8.
7. Mesonotal integument almost black, scales dark brown ; cowl narrow in middle, widening out at sides .... *hirsutipleura*, p. 291.
   Similar, but cowl trilobed .... *comatus*, p. 292.
   Mesonotal integument and scales reddish-brown ; cowl widest in middle, narrowing at sides .... *agrestis*, p. 293.
8. Fairly numerous upright scales on head (nape) ; hypopygium comparatively very large .... *atrius*, p. 293.
   Few, if any, upright scales on head ...... 9.
9. Mesonotal scales golden-brown rather than dark brown ; a very large shield-like chitinisation on either side of spermathecal eminence .... *andamanensis*, p. 290.
   Mesonotal scales dark brown rather than golden-brown ; hypopygium of different form .... 10.
10. Small blackish species ; lateral pale markings on abdomen hardly, if at all, visible dorsally .... 11.
    Dark brown species ; lateral pale markings on abdomen visible from above and usually produced well on to dorsum ...... 12.
11. Postgenital plate a single large lobe, apex not usually emarginate ; no definite hairy processes anterior to spermathecal eminence .... *butleri*, p. 296.
    Postgenital plate emarginate ; a pair of hairy processes anterior to spermathecal eminence .... *sigmoides*, p. 295.
12. Cowl markedly rounded .... 13.
    Cowl much flatter and very wide .... *cautus*, p. 288.
13. A fairly large shield-like plate on either side of spermathecal eminence .... *vallistris*, p. 290.
    Atrial plate with characteristic pointed chitinisation, anterior to spermathecal eminence, nearly meeting that of other side in middle line .... *pseudomediofasciatus*, [p. 286.

149. Aëdes (Aëdes) uniformis (Theobald), 1910 *.

Rec. Ind. Mus. iv, p. 33 (*Skusea*) (♀). TYPE-LOC.: Pallode, 20 miles north-east of Trivandrum, Travancore, South India, xi. 1998 (*Annandale*). TYPE: ♀ in Ind. Mus.

ADULT ♀ †.—A small dark brown species. Wing 2·5–3 mm. Abdomen without pale markings, except for small lateral patches of pale scales on tergite I. Head apparently without any upright scales on nape. Palpi about ⅐ length of proboscis. Mesonotum deep brown; 4–5 *ppn* bristles, about 7 along posterior border of sternopleura, about 12 upper mesepimeral, but no lower. Both tarsal claws of all legs toothed. *Hypopygium* (fig. 70, **a**): postgenital plate slightly emarginate; cowl membranous; anterior lip of atrium with a pair of submedian lobes (indicated by dotted line in figure).

Fig. 67.



Mesepimeron of three species of *Aëdes*, subgenus *Aëdes*, showing distribution of hairs and bristles: **a**, *uniformis*; **b**, *hirsutipleura*; **c**, *vallistris* (spiracle on right of each figure).

♂.—Resembles ♀, except for plumose antennæ. Hind tarsal claws toothed. *Hypopygium* (fig. 68, **a**): coxites small, especially ventrally, where they are joined by harpaginal fold, produced apically into a point. Style widened in middle and with terminal appendage. Paraproct single, strongly curved, and pointed, 9t with a pair of submedian lobes and a finger-like projection on each side laterally. A pair of very elongate chitinisations apparently forming part of the phallosome.

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* [This is evidently very closely related to the Malayan *A. fragilis* Leic. and *A. indecorabilis* Leic., which have a very similar hypopygium (though different in details). Both these species (which are probably distinct from one another—not synonymous, as quoted by Edwards, 1932) have white markings on sides of abdominal tergites.]

† Theobald 1910 *b*, p. 491; Barraud 1928 *b*, p. 366.

LARVA.—Unknown.

HABITAT.—Pools in jungle.

DISTRIBUTION.—BOMBAY DECCAN : Tavargatti *, Belgaum dist., viii. 1921 (*Barraud*) ; Kambarganvi *, Dharwar dist., 1929 (C.M.B. records). MALABAR COAST : Pudupadi *, x. 1915 (*Khazan Chand*). TRAVANCORE : type-locality *, as given above. NORTH BENGAL : Sukna *, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*).

Not known from elsewhere.

150. **Aëdes (Aëdes) abditus** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 614 (♀). TYPE-LOC. : Sukna, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). TYPE : ♀ in Brit. Mus.

ADULT.—A small brownish-black mosquito resembling *A.* (*A.*) *uniformis*. Wing 2·6 mm.

♀.—*Head* : with a few upright scales on nape ; palpi about ⅕ length of proboscis. Mesonotum and scutellum brownish-black ; 4 *ppn* bristles ; no lower mesepimeral bristles. Tarsal claws of hind legs toothed. Abdominal tergites almost black, lighter on lateral borders, but with no distinct pale markings. *Hypopygium* (fig. 70, **b**) : postgenital plate a single lobe ; basal parts resembling those of *uniformis*, but differing as shown in figures.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

151. **Aëdes (Aëdes) yusafi** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 612 (♀). TYPE-LOC. : Roshanara Gardens, Delhi, iv. 1914 (*Christophers*). TYPE : ♀ in Brit. Mus.

ADULT ♀.—A medium-sized species (wing 2·7–3 mm.), resembling *A.* (*A.*) *indicus* in general appearance, but differing from that, and from all other known Indian species, in having *apn* completely covered with silvery-white scales. Head-scales mainly brownish-black, a patch of white scales in middle of vertex in front extending forwards between eyes, a patch of similar scales at each side of head ; apparently no upright scales. Palpi about ⅕ length of proboscis. Integument of mesonotum brownish-black, scales rather lighter, many white ones around margin; 6 *ppn* bristles, 15 upper mesepimeral but no lower. Both tarsal claws on all legs toothed. Abdominal tergites almost black, with rather large basal lateral white patches extending on to dorsum but not forming complete bands; tergite I entirely dark; sternites with basal white bands and apical dark bands of about equal width. *Hypopygium* (fig. 70, **c**): atrium and associated chitinisations small compared with size of cerci. Postgenital plate usually a single lobe, occasionally slightly emarginate at apex. Cowl lobed at each side, with marked median depression.

♂ and LARVA.—Unknown.

DISTRIBUTION.—DELHI *, type-locality, as given above, type and 15 other ♀♀. PUNJAB: Amritsar *, viii. 1910 (*Christophers*); Karnal *, viii. 1928 (*Barraud*).

Not known from elsewhere.

152. **Aëdes (Aëdes) indicus** (Theobald), 1907 †.

M.C. iv, p. 238 (*Neomacleaya*) (♀). TYPE-LOC.: India (probably Lahore, Punjab) (*Christophers*). TYPE: ♀ in Brit. Mus.

Skusea mediofasciata Theobald, 1907, M.C. iv, p. 544 (♂ & ♀). TYPE-LOC.: India (probably Lahore, Punjab) (*Christophers*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—A moderate-sized dark brown species. Wing 3–3·5 mm.

♀.—Abdomen brownish-black, marked with complete transverse pale bands on tergites II–IV, a pale band also on V in some specimens; in others this is divided into lateral patches as on VI and VII. The bands and patches are slightly removed from bases of segments, but that on II is often basal. Apparently no upright scales on head; 5–7 *ppn* bristles; 12–16 upper mesepimeral, but no lower. Tarsal claws of hind legs simple. *Hypopygium* (fig. 70, **d**): cowl strongly curved and with wide chitinised lip. Numerous long hairs, apparently arising from spermathecal eminence, obscuring the form of the atrial plates.

♂.—Differs from ♀ in having lateral pale spots on abdominal tergites instead of bands, plumose antennæ, and in its smaller size. *Hypopygium* (fig. 68, **b**): coxite with broad, blunt projection at apex. Style slender, curved, with small pointed terminal appendage. A single slender, elbowed process arising from inner surface of coxite. Paraproct single, long, slightly curved, and pointed. No spines at ventral root.

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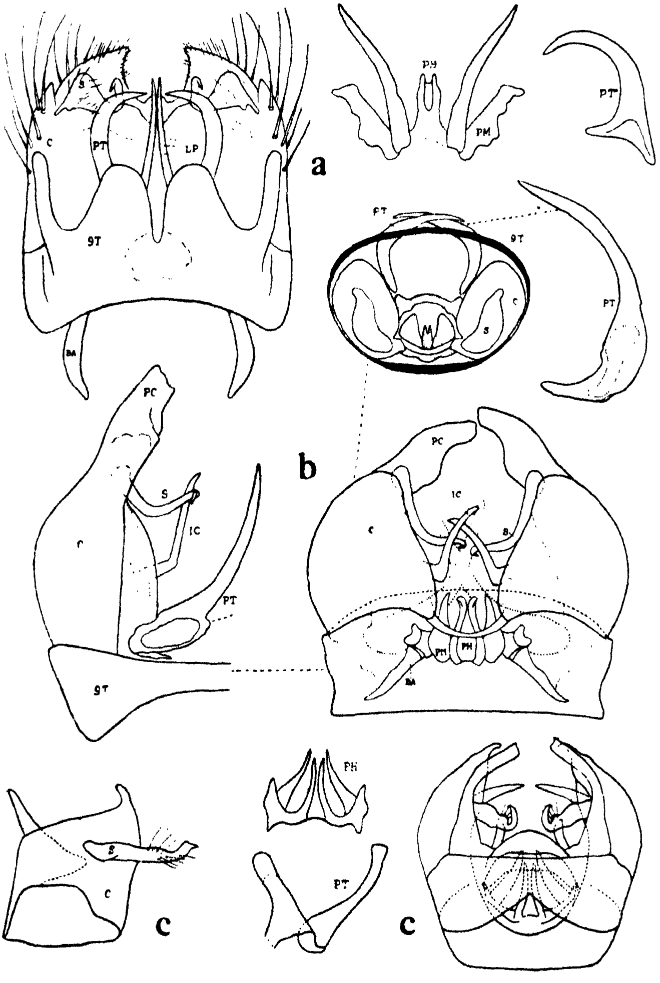
† [The Philippine *A. nigrotarsis* Ludl. is closely allied, differing in details of hypopygial structure.]

‡ Edwards 1913 *b*, p. 229 (syn.); Barraud 1928 *b*, p. 366.

Larva (fig. 69).—*Head* brown, darker posteriorly. Antenna light brown; a few small dark spicules on shaft; hair-tufts usually of 3 stout frayed branches, attached rather nearer base than apex; apical bristles all arising very near tip of shaft. Preclypeal spines pale, slender, fairly long, and tapering to a point. Median hairs of mouth-brushes without

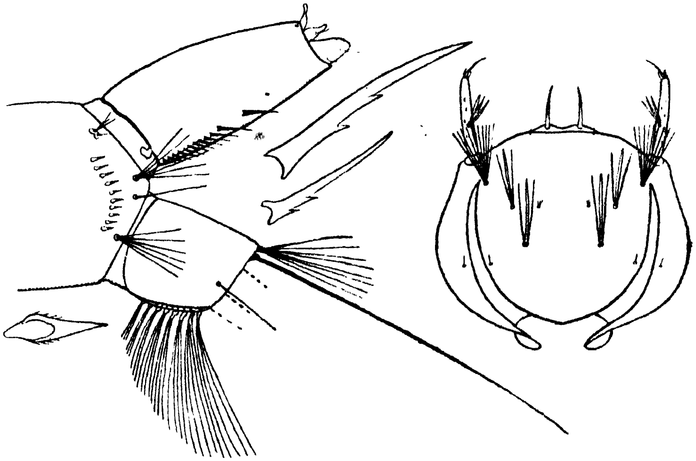
Fig. 68.



♂ hypopygia of *Aëdes*, subgenus *Aëdes*: **a**, *uniformis*; **b**, *indicus* (dorsal, ventral, and posterior views); **c**, *clavatus*. PC, prolongation or processes at end of coxite; IC, process on inner side of coxite. Other lettering as on p. 4.

obvious serrations or teeth. Frontal hairs placed as shown in figure: *A* with 7–13 branches; *B* and *C* usually of 3 branches, the middle one stout. In one specimen hair *B* is a single, very stout, frayed bristle on one side of head; hair *d* small, with 3–4 very fine branches; hair *e* fine and usually single, but may be split. Mentum with about 17 teeth on either side of central one, the teeth very regular in size. Larger lateral tufted hairs on *thorax* moderately developed, meso- and metapleural tubercles with small spines at bases. *Comb* of about 10 large teeth arranged more or less in a row; teeth delicately fringed on basal ½. *Siphon* pale brown; surface covered with minute ridges; a very narrow dark ring at base; length along dorsal border in side view from 0·70

Fig. 69.



Larva of *Aëdes* (*Aëdes*) *indicus* Theo.

to 0·82 mm., and about 2¼ times length of diameter at base. Acus moderately developed. Pecten of 11–14 long teeth, all with lateral denticles, though those on distal teeth may be quite small. The more distal one or two teeth usually more widely spaced than those in main rank. Hair-tuft small, with 3–5 short, fine branches, attached between most distal pecten-tooth and apex of siphon. *Anal segment* enclosed, except ventrally, with chitinisation; *isc* of about 8 rather short branches all about same length; *lh* single. Fan-hairs of only moderate length, about 12 arising from fan-plate, each split into a number of branches; 2 or 3 branched hairs arising from membrane between fan-plate and base of segment. Papillæ apparently about length of longest fan-hairs.

HABITAT.—Open pools, rain-filled ditches, etc.

DISTRIBUTION.—PUNJAB : Amritsar *, viii. 1910, and iv. 1911 (*Christophers*) ; Lahore * (*Christophers*), and viii. 1923 (*Sinton*) ; Karnal *, vii. 1927, vii. 1928, viii. 1930, and x. 1931 (*Barraud*). DELHI * : iv. 1914 (*Christophers*). SIND : Larkana *, x. 1928 (*Baily*). UNITED PROVINCES: Saharanpur *, ix. 1927 (*Sinton*). BIHAR : Pusa *, various dates, vi.–x. 1913–1929 (*Shaffi*). MADRAS : Madras Town *, iv. 1911 (*Justice*).

Not known from beyond limits of Indian region.

153. **Aëdes (Aëdes) pseudomediofasciatus** (Theobald), 1910.

M.C. v, p. 489 (*Skusea*) (♂). TYPE-LOC. : Peradenyia and Hakgala, Ceylon, iii. & iv. 1907 (*Green*). TYPE : 2 co-type ♂♂ in Brit. Mus.

ADULT ♀†.—Moderate-sized species (wing 3·5 mm.) ; thorax dark reddish-brown, abdomen darker. Lateral pale markings on tergites II–VII, usually produced well on to dorsum, and in some specimens forming almost complete bands on VI or VI–VII. Head with a few upright scales on nape and usually a few narrow pale scales in middle of vertex ; 5–6 *ppn* bristles, 8 upper mesepimeral, and a few hairs in middle of the sclerite just below a patch of scales. *Hypopygium* (fig. 70, **e**) : cowl strongly rounded. Atrial plates with a characteristic pointed chitinisation on each side.

♂.—Very similar to ♀. *Hypopygium* (fig. 71, **a**) : coxite with 4–5 blunt teeth at apex, all about same length. Style truncate at tip, with small subterminal hair. Numerous hairs and some strong bristles on inner surface of coxite. Paraproct forked, the shorter arm internal to longer.

LARVA.—This has not been isolated in India, but has been figured by Senior-White (1927, pl. xi) from Ceylon. It appears to be very similar to that of *A.* (*A.*) *indicus* described above, but the comb-teeth are shown as having lateral fringes to the tip, whereas in the larva referred to the fringe is confined to the basal ½.

HABITAT.—Hill-stream, in company with *Anopheles maculatus* ; also in swamp.

DISTRIBUTION.—BOMBAY DECCAN : Kambarganvi *, Dharwar dist., 1929 (C.M.B. records). SOUTH INDIA : Nilgiri Hills *, x. 1915 (*Khazan Chand*) ; Kallar, xii. 1922 (*T. B. Fletcher*). MADRAS : Guindy * (Madras Town), viii. 28 (C.M.B. records). CEYLON : type-localities, as given above, and Colombo, 1913 (*James*) ; Marble, Kurunegalla dist. (*Senior-White*).

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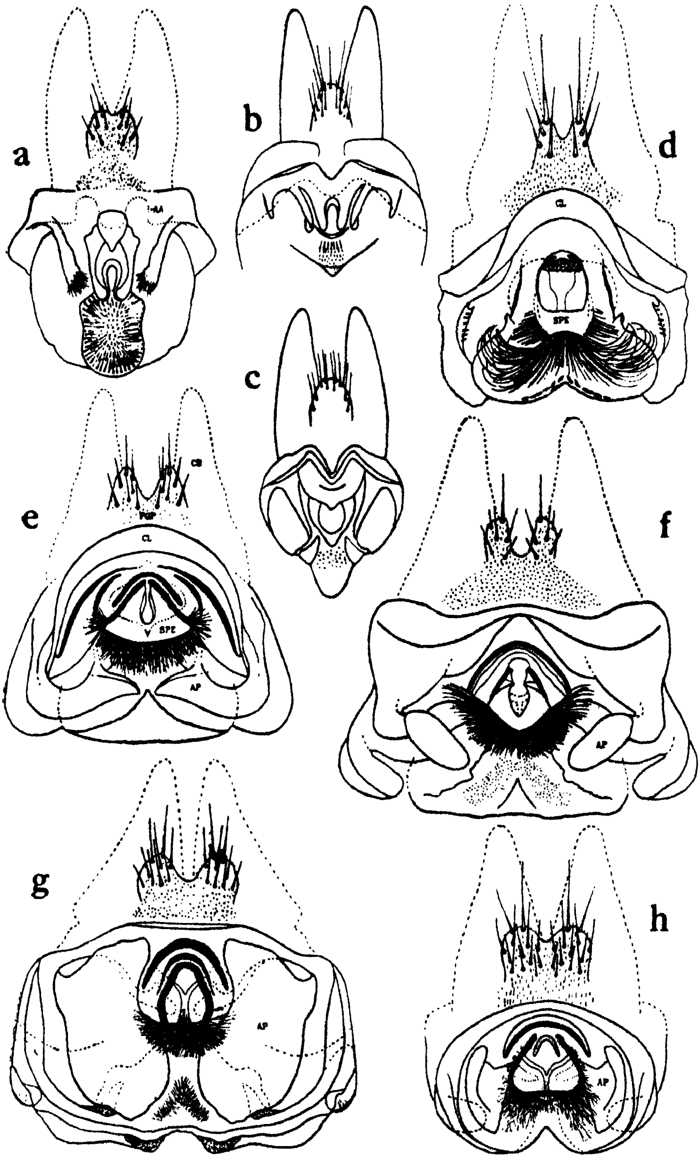
† Edwards 1917, p. 222 ; Barraud 1928 *b*, p. 367.

Fig. 70.



♀ hypopygia of *Aëdes*, subgenus *Aëdes*: **a**, *uniformis*; **b**, *abditus* **c**, *yusafi*; **d**, *indicus*; **e**, *pseudomediofasciatus*; **f**, *cautus*; **g**, *andamanensis*; **h**, *vallistris*. Floor of atrium not shown.

Lettering: AA, anterior lip of atrium; AP, shield-like plate on either side of spermathecal eminence; CL, cowl; CR, cercus; PGP, postgenital plate; SPE, spermathecal eminence.

154. **Aëdes (Aëdes) cautus** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 368 (♂ & ♀). TYPE-LOC.: Tavargatti, Bombay Deccan, Belgaum dist., viii. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Resembles *A.* (*A.*) *pseudomediofasciatus* very closely in both sexes, but differs in structure of hypopygium.

♀.—*Hypopygium* (fig. 70, **f**): cowl wide and nearly flat in middle, outer angles forming nearly square shoulders. Atrial plates with a characteristic oval chitinisation on each side.

♂.—*Hypopygium* (fig. 71, **b**): apex of coxite produced into 5 strong tooth-like processes, the one at extreme tip longer than others. Style curved and pointed, with a hair arising some distance from tip. Four strong spines arising from inner surface of coxite towards ventral root. Paraproct forked, shorter arm external to longer.

LARVA.—Unknown.

HABITAT.—Ground-pools in jungle.

DISTRIBUTION.—BOMBAY DECCAN: Tavargatti *, type-locality, as given above; Kambarganvi *, Dharwar dist., 1929 (C.M.B. records). MALABAR COAST: Pudupadi *, x. 1915 (*Khazan Chand*).

155. **Aëdes (Aëdes) ceylonicus** Edwards, 1917.

Bull. Ent. Res. vii, p. 221 (♂). TYPE-LOC.: Colombo, Ceylon (*K. McGahey*). TYPE: ♂ in Brit. Mus.

[ADULT.—Closely resembles *A. pseudomediofasciatus*, no external differences being apparent. No scales on *apn*; a few small hairs in middle of mesepimeron.

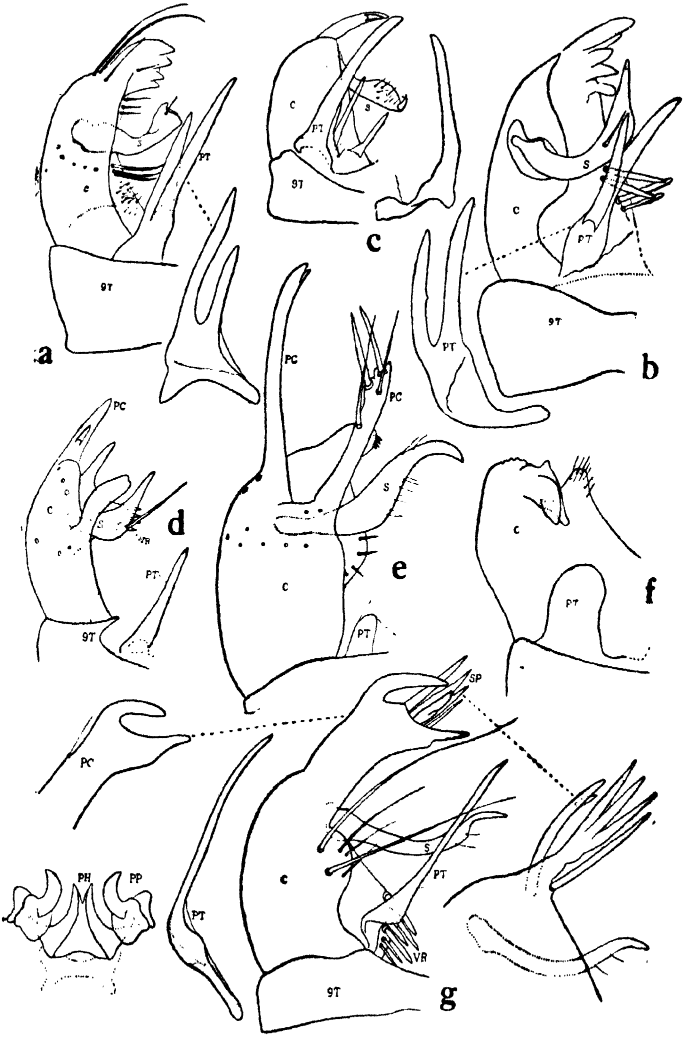
♂.—*Hypopygium* (fig. 73, **g**): sternite rather large and swollen, with a pair of pointed bare projections on margin; coxite with tip slightly produced and divided into two sharp points, tergal point with a small tooth, sternal point with a small patch of hairs below it, but no spines; style minute, with one hair at middle and another at tip; no chitinous processes from anal segment, but some small internal processes at root of coxite; phallosome with a pair of long rods.

♀ (if correctly associated with ♂).—*Hypopygium*: somewhat intermediate between *A. pseudomediofasciatus* and *A. atrius*, with rather more resemblance to the latter.

PUPA and LARVA.—Unknown.

DISTRIBUTION.—Known only from Colombo, CEYLON (*K. McGahey*, 1914; *G. M. Henry*, 14–19. x. 1914); specimens captured indoors.]

Fig. 71.



♂ hypopygia of *Aëdes*, subgenus *Aëdes*: **a**, *pseudomediofasciatus*; **b**, *cautus*; **c**, *rami*; **d**, *vallistris*; **e**, *hirsutipleura*; **f**, *pseudodiurnus*; **g**, *andamanensis*. PC, prolongation or processes at end of coxite; VR, spines at ventral root of coxite. Other lettering as on p. 4.

156. **Aëdes (Aëdes) andamanensis** Edwards, 1922 †.

Ind. Journ. Med. Res. x, p. 272 (♂). TYPE-LOC.: Andaman Is., ix. 1911 (*Christophers*). TYPE: ♂ in Brit. Mus.

Neomacleaya indica var. *simplex* Theobald, 1908, Rec. Ind. Mus. ii, p. 291 (♀). TYPE-LOC.: Sylhet, Assam, vi. 1905 (*Hall*). TYPE: ♀ in Ind. Mus.

ADULT ♀ ‡.—Dark brown, of moderate size (wing about 3·5 mm.). Lateral pale markings on abdominal tergites, very variable in size, but usually produced on to dorsum. Mesonotal scales deep golden brown; 7–8 *ppn* bristles; about 15 bristles and some hairs along upper and posterior borders of sternopleura; about 15 upper mesepimeral bristles, and below these numerous hairs scattered over the larger part of the sclerite, except lower ⅓. Head with narrow yellowish border to eyes, some pale scales in middle of vertex, and a few upright scales on nape. *Hypopygium* (fig. 70, g): cowl flat, wide, and narrow. A very large shield-like plate on either side of spermathecal eminence, apparently a development of the atrial plate.

♂.—Resembles ♀. Wing about 2·5 mm. Antennæ plumose. *Hypopygium* (fig. 71, g): coxite very much drawn out at apex into a wide arm with two horns. Ventrally a three-pronged process and two other processes arise at, or near, apex of coxite. Style slender, curved, and pointed, with 2 hairs arising some distance from apex. Six strong spines at ventral root. Paraproct single, long, and slender.

LARVA.—Unknown.

DISTRIBUTION.—ANDAMAN IS. * and Sylhet *, ASSAM, type-localities, as given above; Golaghat *, Sibsagar dist., xii. 1924, i. 1925 (*Barraud*). E. BENGAL: Chittagong *, viii. 1922 (*Barraud*). MALABAR COAST: Pudupadi *, x. 1915 (*Khazan Chand*).

Known also from COCHIN CHINA, SUMATRA, and PHILLIPPINES *.

157. **Aëdes (Aëdes) vallistris** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 369 (♂ & ♀). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, xi. & xii. 1924 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀.—A small species (wing about 3 mm.) with lateral pale markings on abdominal tergites, variable in size, but usually slightly produced on to dorsum; 5 *ppn* bristles;

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† [A sketch sent by Dyar of the hypopygium of *A. margarsen*, described by him in 1925 from the Philippine Is., shows great similarity in structure to *A. andamanensis*. As the present author notes having received *andamanensis* from the Philippines it is possible that *margarsen* may be a synonym of this species.]

‡ Barraud 1928 *b*, p. 368; Edwards 1928 *a*, p. 273.

about 10 sternopleural along upper and posterior borders; 10–12 upper mesepimeral, and some small hairs at about middle of this sclerite (fig. 67, **c**). *Hypopygium* (fig. 70, **h**): atrial chitinisations somewhat resembling those of *A.* (*A.*) *andamanensis*, but shield-like plates smaller and cowl much more rounded.

♂.—Resembles ♀ but is rather smaller. Antennæ plumose. *Hypopygium* (fig. 71, **d**): coxite with two terminal pointed processes, and a third thumb-like process at about middle of dorsal border. Four spines at ventral root. Style wide, curved, and pointed, with a long hair arising at about middle. Paraproct single, and only of moderate length.

LARVA.—Unknown.

DISTRIBUTION.—ASSAM: Golaghat *, type-locality, as given above. BURMA: Rangoon *, 1931 (*Feegrade*).

Not recorded from elsewhere.

158. **Aëdes (Aëdes) hirsutipleura** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 370 (♂ & ♀). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, xii. 1924 & i. 1925 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—A medium-sized brownish-black species with small lateral pale markings on abdomen, not usually produced on to dorsum. Mesonotal scales dark brown, some lighter ones on front margin, and a roundish patch of light brown scales over each wing-root; 5–6 large *ppn* bristles and about 6–7 smaller. At a point on sternopleura opposite lower corner of mesepimeron there are numerous hairs and some scales. Larger part of mesepimeron covered with bristles and fine hairs, conspicuous even in pinned specimens (fig. 67, **b**) †.

♀.—*Hypopygium* (fig. 72, **a**): comparatively large. Post-genital plate with two pronounced lobes. Cowl wide and narrow, outer corners bluntly pointed.

♂.—*Hypopygium* (fig. 71, **e**): apex of coxite produced into two arms on tergal side, one arm with two strong spines and two more slender, the other divided at the tip. On sternal side there are a few small spines at apex of coxite. Style curved, widened in middle, pointed, and without an obvious appendage, but with hairs along apical ½. Paraproct unusually short.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

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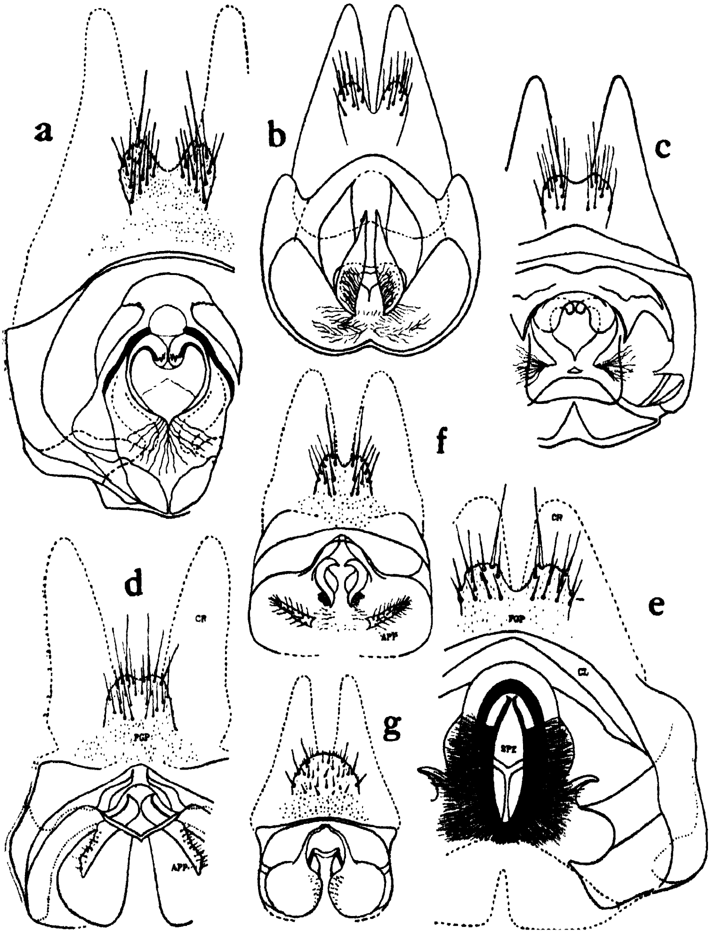
† [Other species of the subgenus showing numerous fine hairs on lower part of mesepimeron are *A. singularis* Leic., *A. virilis* Leic., *A. uncus* (Theo.) Edw., and *A. leicesteri* Edw., all found in Malaya. Of these, *A. uncus* most closely resembles *A. hirsutipleura* in hypopygial structure, the differences being quite small.]

159. **Aëdes (Aëdes) comatus** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 615 (♀). Type-loc.: Sukna, N. Bengal, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). Type: ♀ in Brit. Mus.

Adult ♀.—Resembles *A.* (*A.*) *hirsutipleura* closely in markings and in presence of fairly numerous bristles on lower part of mesepimeron, but with differences in structure of *hypopygium* (fig. 72, **b**): postgenital plate with pronounced

Fig. 72.



♀ hypopygia of *Aëdes*, subgenus *Aëdes*: **a**, *hirsutipleura*; **b**, *comatus*; **c**, *agrestis*; **d**, *lugubris*; **e**, *atrius*; **f**, *sigmoides*; **g**, *butleri*. APP, hairy processes anterior to spermathecal eminence. Other lettering as in fig. 70.

lobes. Cowl with wide median lobe and smaller lateral lobes (differing in this respect from all other Indian species). Atrial plates fairly large and rounded.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

160. **Aëdes (Aëdes) agrestis** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 613 (♀). TYPE-LOC.: Nilgiri Hills, S. India, ix. 1915 (*Khazan Chand*). TYPE: ♀ in Brit. Mus.

ADULT.—Resembles *A.* (*A.*) *hirsutipleura* both in markings and in presence of numerous bristles and hairs on mesepimeron, but with marked differences in hypopygial structures.

♀.—*Hypopygium* (fig. **72, c**): comparatively large. Cowl only slightly curved. Postgenital plate large and not markedly emarginate on apical border.

♂ and LARVA.—Unknown.

DISTRIBUTION.—NILGIRI HILLS *: type-locality, as given above. BOMBAY DECCAN: Nagargali *, viii. 1921 (*Barraud*). Not known from elsewhere.

161. **Aëdes (Aëdes) yerburyi** Edwards, 1917.

Bull. Ent. Res. vii, p. 222 (♂). TYPE-LOC.: Kitli Station, Ceylon, xi. 1891 (*Yerbury*). TYPE: ♂ in Brit. Mus.

[ADULT.—Closely resembles *A. hirsutipleura*, the mesepimeron having numerous hairs on the middle $\frac{1}{3}$ (the type is rather mouldy and denuded and the ornamentation not well shown).

♂.—*Hypopygium* (fig. 73, **a**): very large, and very different from all other species; sternite apparently with a pair of finger-like processes; coxites swollen, each with a large tergal flap extending the whole length and produced apically into a point, and on the sternal side at tip with a long hook-like process; style rather large, broad, and flattened; paraprocts represented by a pair of very long, stout, sinuous rods reaching beyond end of coxite.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from CEYLON, type-locality, as given above, and Trincomali, xi. 1906 (1 ♂ in British Museum, mounted by Theobald; collector unknown)].

162. **Aëdes (Aëdes) atrius** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 371 (♀). TYPE-LOC.: Nongpoh, Khasi Hills dist., Assam, vii. 1922 (*Barraud*). TYPE: one co-type ♀ in Brit. Mus.; one in M.S.I. coll., Kasauli.

ADULT ♀.—*Head* mainly covered with flat dark scales, some pale ones on vertex, along eye-margins, and low down at each side; fairly numerous upright scales on nape. Mesonotal scales dark brown, with some lighter ones on front margin; 4–5 strong *ppn* bristles; about 18 upper mesepimeral; no lower. Abdomen almost black, with lateral pale markings, produced well on to dorsum on IV–VII, especially on V, those on II and III hardly visible in dorsal view. *Hypopygium* (fig. 72, **e**): comparatively very large. Cerci broad and rather short. Postgenital plate divided into a pair of large broad lobes. Numerous hairs arising from spermathecal eminence. Atrial plates of distinctive shape.

♂.—Unknown, unless the species here described is the ♀ of *A.* (*A.*) *yerburyi*, known only from Ceylon.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

163. **Aëdes (Aëdes) lugubris** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 372 (♀). TYPE-LOC.: Rangoon, Burma, v. 1926 (*Hamilton Miller*). TYPE: one co-type ♀ in Brit. Mus.; one in M.S.I. coll., Kasauli.

ADULT ♀.—A very dark species of moderate size. Head mainly covered with flat black scales, a few pale ones on vertex, a narrow pale patch low down at each side. Integument of mesonotum black, scales deep brown; 5–6 *ppn* bristles; about 12 upper mesepimeral and a few hairs below, scattered over the sclerite, chiefly towards posterior border. A complete, or almost complete, narrow band of white scales on tergite II, curving on to dorsum at sides, and reaching base of tergite in middle line; small lateral pale markings on III–VII. *Hypopygium* (fig. 72, **d**): postgenital plate only slightly emarginate at apex. Cowl membranous. A pair of hairy processes, apparently connected with the spermathecal eminence, directed anteriorly.

♂ and LARVA.—Unknown.

DISTRIBUTION.—BURMA: Rangoon *, type-locality, as given above, also 1930 (*Feegrade*). ANDAMAN IS.: Port Blair *, iii. 1925 (*Shaffi*), and vii. 1926 (*Sobha Ram*).

Not recorded from elsewhere.

164. **Aëdes (Aëdes) clavatus** Barraud, 1931.

Ind. Journ. Med. Res. xix, p. 614 (♂). TYPE-LOC.: Sukna, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). TYPE: ♂ in Brit. Mus.

ADULT ♂.—Medium-sized; wing about 2·8 mm. *Head* mainly covered with dark brown flat scales, those along eye-margins and at sides light brown. Fairly numerous upright scales on nape. Palpi about $\frac{1}{6}$ length of proboscis. Mesonotum chestnut-brown, with slight reddish tinge; 6 *ppn* bristles; 10 strong upper mesepimeral, and 6 smaller, arranged in a row extending downwards, and within the patch of scales. Dorsum of abdomen brownish-black, small basal lateral pale patches, not produced on to dorsum. *Hypopygium* (fig. 69, **c**): a short finger-like process at apex of coxite dorsally, and a pointed process below apex ventrally. Style articulated some distance below apex of coxite on inner side. Paraproct divided into two arms, one longer than the other, both slightly clubbed and truncated.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

165. **Aëdes (Aëdes) pseudodiurnus** (Theobald), 1910.

Rec. Ind. Mus. iv, p. 32 (*Skusea*) (♂). TYPE-LOC.: Sukna, Darjeeling dist., 500′, vii. 1908 (*Annandale*). TYPE: ♂ in Ind. Mus.

ADULT ♂ *.—A moderate-sized dark brown species with lateral pale markings on abdomen. Head-scales brownish-black, with some light ones in middle of vertex and at sides. Mesonotal scales dark rich brown. *Hypopygium* (fig. 71, **f**, drawn from type ♂, which is damaged, coxites being broken); paraproct apparently unusually broad and short.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

166. **Aëdes (Aëdes) rami** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 370 (♂). TYPE-LOC.: Golaghat, Sibsagar dist., Assam, xii. 1924 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT ♂.—A small dark brown species with small lateral pale markings on abdomen. *Hypopygium* (fig. 71, **c**): a rather long pointed process, with an accessory point near its tip, projecting from apex of coxite. Two very strong spines, or straight processes, on inner side of coxite towards base. Style enlarged towards tip, a number of hairs on terminal ½ and a pointed terminal appendage. Paraproct single and very long, longer than coxite.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

167. **Aëdes (Aëdes) sigmoides** Barraud, 1928.

Ind. Journ. Med. Res. xvi, p. 373 (♀). TYPE-LOC.: Port Blair, Andaman Is., ix. 1911, caught in crab-hole (*Christophers*). TYPE: ♀ in Brit. Mus.

ADULT ♀.—A small blackish species with very small lateral pale markings on abdomen, not produced on to dorsum.

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* Barraud 1928, p. 371.

Hypopygium (fig. 72, **f**): postgenital plate emarginate at apex. Cowl membranous. Two hairy processes, apparently connected with the spermathecal eminence, directed outwardly and somewhat posteriorly.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

168. **Aëdes (Aëdes) butleri** Theobald, 1901.

M.C. ii, p. 230 (♀). TYPE-LOC.: Selangor, Malay Penin., x. 1899 (*Butler*). TYPE: ♀ in Brit. Mus.

Skusea diurna Theobald, 1903, Entom. xxxvi, p. 259 (♀). TYPE-LOC.: Jugra, near Kuala Lumpur, Malay Penin. (*Durham*). TYPE: ♀ in Brit. Mus.

Stegomyia hatiensis Carter, 1910, Entom. xliii, p. 275 (type ♀ only). TYPE-LOC.: Saigon (or Ha-tien ?), Cochin China (*Broquet*). TYPE: ♀ in Brit. Mus.

ADULT ♀ †.—A small blackish species with lateral pale markings on the abdomen, not produced on to the dorsum. Thoracic integument black. Mesonotal scales very dark brown. About 12 upper mesepimeral bristles, and below these a number of hairs scattered over the middle part of the sclerite towards posterior margin. *Hypopygium* (fig. 72, **g**): postgenital lobe comparatively large and not usually emarginate on apical border. Cowl wide and nearly flat, the outer corners rounded. No definite hairy processes connected with spermathecal eminence.

[♂.—*Hypopygium* (fig. 73, **e**, **f**): size small; coxites short and rather broad, rounded apically, with an arm arising beyond middle of internal border on sternal slide, this arm ending in two small teeth, and with another tooth above its base; style comparatively large, divided almost to base into three arms, one slender and sickle-shaped, one round-tipped, the third stouter, pointing in a different direction, and ending in 2 sharp teeth; paraprocts very small.]

LARVA.—Unknown.

HABITAT.—Brackish pools in mangrove swamps (*Leicester*).

DISTRIBUTION.—ANDAMAN IS. *, xi. 1911, caught in forest where biting (*Christophers*). MALABAR COAST *, x. 1915 (*Khazan Chand*).

Known also from COCHIN CHINA and MALAY PENINSULA.

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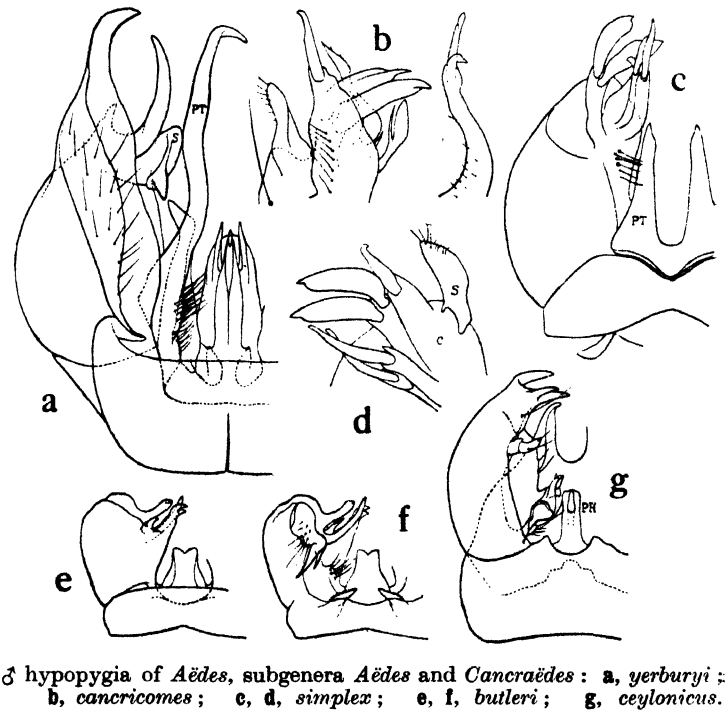
† Theobald 1903 *a*, p. 295 *Verrallina*); 1907, p. 547 (*Skusea diurna*); Leicester 1908, p. 196 (*Verrallina*); Edwards 1913 *b*, p. 229 (syn.); 1917, p. 220; Barraud 1928 *b*, p. 373.

Subgenus **CANCRAËDES** Edwards, 1929.

Bull. Ent. Res. xx, p. 342. Genotype, *Aëdes* (*Skusea*) *cancricomes* Edwards.

Adult.—Small dark brown mosquitoes, without special ornamentation. Scales on dorsum of head and on scutellum broad and flat. Proboscis about length of fore femur. Palpi very short in both sexes, about $\frac{1}{6}$ length of proboscis. Plumes of antennæ of ♂ evenly spread round shaft (hairs few and short in *cancricomes*). One or two lower mesepimeral bristles present. All tarsal claws simple in both sexes. Segment VIII of abdomen of ♀ retractile, cerci fairly long, but usually almost hidden within ring of VII. Coxite of ♂ hypopygium short, with group of leaf-like processes and strong spines near apex. Style short and thick, without appendage. Harpago absent. Phallosome divided into lateral plates, with one or two teeth or spines.

Fig. 73.



♂ hypopygia of *Aëdes*, subgenera *Aëdes* and *Cancraëdes* : **a**, *yerburyi* ; **b**, *cancricomes* ; **c**, **d**, *simplex* ; **e**, **f**, *butleri* ; **g**, *ceylonicus*. Lettering as on p. 4.

Larva.—As in subgenus *Aëdes*.

DISTRIBUTION and BIONOMICS.—The subgenus is entirely Oriental. Four species are known, of which two have been found in the Andaman Islands; one of these also occurs in Ceylon and the Nicobar Islands. The larvæ live in crab-holes, or in holes in mangrove swamps. The habits of the adults are not known.

169. **Aëdes (Cancraëdes) cancricomes** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 272 (*Aëdes* (*Skusea*)) (♂ & ♀). TYPE-LOC.: Andaman Is., vii. 1911, breeding in crab-holes (*Christophers*). TYPE: ♂ & ♀ in Brit Mus.

ADULT †.—Resembles *A.* (*C.*) *simplex* closely, but differs as follows:—Abdomen with lateral basal creamy-white triangular patches on II–VII; *apn* and *ppn* largely dark, like mesonotum. Antennæ of ♂ longer and much less hairy, not appearing plumose, the hairs not borne on raised ridges; last two segments together about same length as segments 2–12 together.

♂.—*Hypopygium* (fig. 73, **b**): differs from *A.* (*C.*) *simplex* in form of processes near apex of coxite.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

170. **Aëdes (Cancraëdes) simplex** (Theobald), 1903.

M.C. iii, p. 297 (*Ficalbia*) (♂). TYPE-LOC: Kurunegalla, Ceylon (*Green*). TYPE: ♂ in Brit Mus.

ADULT ‡.—A small brownish-black mosquito, distinguished from *A.* (*C.*) *cancricomes* by absence of pale lateral markings on abdomen, and by the pale pleuræ, including *apn* and *ppn*, contrasting with the dark colour of mesonotum. Distinguished from *A.* (*R.*) *longirostris* by shorter proboscis, and by segment 1 of hind tarsi being shorter than tibia.

♂.—*Hypopygium* (fig. 73, **c**, **d**): in addition to the small thick style, there are several leaf-like and spine-like processes at apex of coxite, differing in form from similar processes in *A.* (*C.*) *cancricomes*.

LARVA.—Unknown.

HABITAT.—Crab-holes.

DISTRIBUTION.—CEYLON: type-locality, as given above. ANDAMAN IS. *, viii. 1911, breeding in crab-holes (*Christophers*). NICOBAR IS., * iii. 1925 (*Isaac*).

It has been recorded from DUTCH EAST INDIES (*Brug*), but this record probably refers to the closely-allied *A.* (*C.*) *curtipes* Edw.

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† Barraud 1928 *b*, p. 362 (*A.* (*Skusea*)).

‡ Edwards 1917, p 224 (*Skusea*); 1928, p. 274 (*A.* (*Skusea*)); Barraud 1928 *b*, p. 362 (*A.* (*Skusea*)).

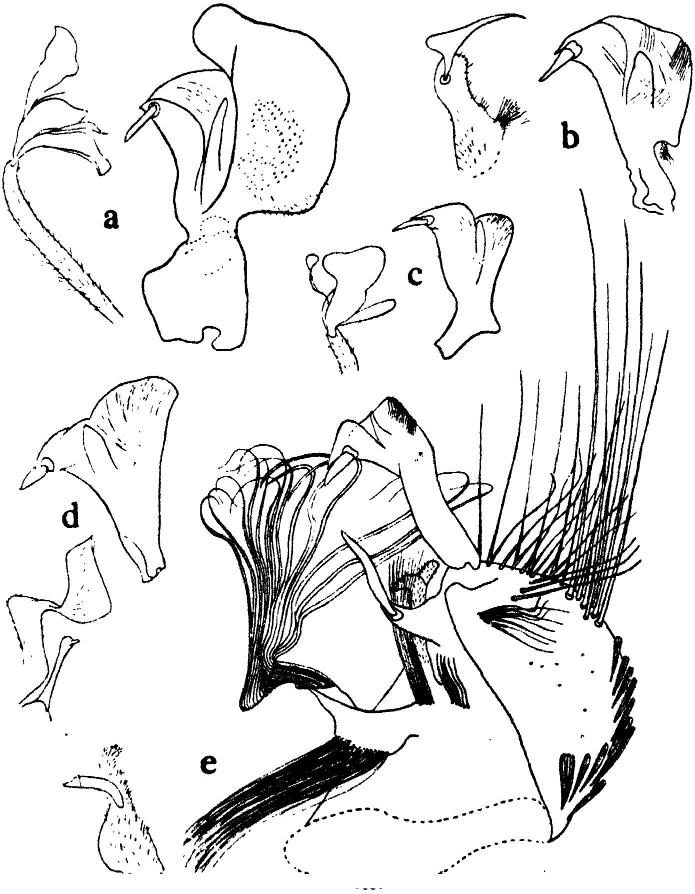
Genus **HEIZMANNIA** Ludlow, 1905.

Can. Ent. xxxvii, p. 130. Genotype, *H. scintillans* Ludl.

Bolbodeomyia Theobald, 1910, Rec. Ind. Mus. iv, p. 31. Genotype, *B. complex* Theo.

ADULT *.—Small, dark-coloured mosquitoes, distinguished by the presence of a collection of small hairs on the postnotum.

Fig. 74.



♂ hypopygial structures of *Heizmannia*: a–d, style and process on inner surface of coxite; e, coxite from inner side, showing hair-tufts and appendages, also process on inner surface (shown separately). a, *himalayensis*; b, *indica*; c, *chandi*; d, *metallica*; e, *covelli*.

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* Barraud 1929 *b*, p. 260.

(The only other Indian mosquitoes having this character are *Tripteroides edwardsi* and *Armigeres* (*Leicesteria*) *flavus*; both these species have other well-marked characters distinguishing them from *Heizmannia.*) Palpi short in both sexes; antenna in ♂ only slightly plumose, but last two segments usually very long, other flagellar segments short; *apn* lobes large and, in some species, practically touching behind the head *. Mesonotum covered with rather broad recumbent scales, usually with metallic lustre; no bristles on dorsum, even immediately in front of scutellum. Usually 3 or 4 *ppn* bristles, no spiracular, postspiracular or upper sternopleural; 1 or 2 lower and several upper mesepimeral.

♂.—*Hypopygium*: coxite comparatively short, wide, and rounded, with subapical lobe carrying 1 or 2 stout spines. Usually several hair-tufts on inner side of coxite towards base, which, in some species, are remarkably long and twisted or matted. Arising from inner side of coxite, towards sternal side, there is also a peculiar process, apparently representing the "harpago" or "claspette"; the apical part, or blade, of this structure is very transparent, and sometimes divided into leaflets, the form of which cannot usually be clearly seen except in heavily stained preparations. Style short, widened apically; appendage stout and pointed. Phallosome divided into small lateral plates with teeth. Paraproct ending in single blunt tooth. In two species the 9th sternite is very large.

LARVA.—Very similar to *Aëdes*. The larvae of four species are known, and descriptions of three of these are given below.

DISTRIBUTION and BIONOMICS.—About twelve species are at present known; these are all Oriental except for one which occurs on the island of Halmaheira. The larvæ live in tree-holes and bamboo-stumps. Nothing is known regarding the habits of the adults.

Key to Adults.

♀♀.

1. Proboscis more than $1\frac{1}{4}$ times length of fore femur .... *indica*, p. 303.
   Proboscis only slightly, if at all, longer than fore femur .... 2.
2. A large patch of silvery scales on mid-lobe of scutellum, extending anteriorly on to mesonotum; hind femur entirely pale on basal $\frac{1}{2}$ .... *himalayensis*, p. 306.
   Only a small patch of silvery scales on mid-lobe of scutellum, or none; hind femur dark along dorsal edge, from base to knee-joint .... 3.

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* [The lobes themselves are not much larger than usual, but appear so owing to their very dense covering of large flat scales.]

3. *apn* entirely dark scaled .... *funerea*, p. 302.
apn with some white or silvery-white scales . 4.
4. Mesonotal scales dull greyish-brown, with little or no metallic lustre ; *apn* large and touching behind head, with white scales anteriorly .... *complex*, p. 302.
Mesonotal scales with strong blue, green, or bronzy metallic lustre ; *apn* more or less separated .... 5.
5. *apn* covered with silvery-white scales; mesonotal scales with bright green or bluish-green lustre .... 6.
apn with white scales in front only ; mesonotal scales with dark blue or bronzy lustre. 7.
6. Outstanding plume-scales on veins 2.1 and 2.2 linear .... *chandi*, p. 308.
These scales rather narrow, but ligulate in shape .... *viridis*, p. 306.
7. Proboscis shorter than fore femur ; mesonotal scales blackish, with bronzy lustre . *covelli*, p. 304.
Proboscis as long as fore femur or slightly longer ; mesonotal scales with deep blue lustre .... 8.
8. Outstanding plume-scales on veins 2.1 and 2.2 linear .... *greeni*, p. 308.
These scales ligulate in shape .... *metallica*, p. 307.

♂♂.

1. *apn* lobes entirely dark scaled .... *funerea*, p. 302.
apn with some white scales .... 2.
2. Ninth sternite very large, much more than ½ length of coxite.................... 3.
Ninth sternite not more than ½ length of coxite .... 4.
3. Proboscis longer than fore femur .... *indica*, p. 304.
Proboscis shorter than fore femur .... *covelli*, p. 305.
4. Style not markedly expanded apically, and divided nearly to the base into two arms.. *complex*, p. 302.
Style expanded apically, and not divided into two arms .... 5.
5. Subapical lobe of coxite with 2 strong spines. *greeni*, p. 308.
Subapical lobe of coxite with only 1 strong spine .... 6.
6. Style greatly expanded apically; coxite with tufts of very long hairs from base ; subapical lobe produced into an arm directed basally, with a single strong spine at extremity .... *himalayensis*, p. 307.
Style less expanded ; coxite with tufts of rather short hairs all about same length ; subapical lobe not produced into a long arm .... 7.
7. Coxite with a large dense tuft of rather short twisted hairs near base ; style with an elbow-like projection near base .... *chandi*, p. 308.
Coxite without any large dense tufts of hairs ; style without an elbow-like projection near its base .... *metallica*, p. 308.

[*Key to known Larvæ.*

1.	Antenna entirely pale, shaft smooth, terminal papilla short	*himalayensis*, p. 307.
	Antenna longer, darkened on distal ½, shaft with some fine spicules, terminal papilla long	2.
2.	Pecten-teeth with long basal denticles	*covelli* (?), p. 305.
	Pecten-teeth all simple	3.
3.	Siphon under 3 × 1	*funerea* (see below).
	Siphon about 4 × 1 (Sumatran species)	*pilosa*.]

171. **Heizmannia complex** (Theobald), 1910.

Rec. Ind. Mus. iv, p. 31 (*Bolbodeomyia*) (♂ & ♀). TYPE-LOC.: Dawna Hills, Lower Burma, iii. 1908 (*Annandale*). TYPE: ♂ & ♀ in Ind. Mus.

ADULT ♀ †.—General coloration dark brown. Proboscis about length of fore femur. Mesonotal and scutellar scales dull greyish-brown, with little or no metallic lustre; *apn* large and practically touching behind head, with white scales anteriorly. Plume-scales on veins 2.1 and 2.2 narrow and linear. Abdomen deep brown, with small lateral pale markings, rather square in shape on segments 2 and 3, small and triangular on remaining segments, and not forming bands over dorsum.

♂.—Very similar to ♀. Antennæ of usual form in this genus. *Hypopygium*: style of characteristic form, being divided nearly to base into two separate arms. Coxite rather square-ended, with a few flattened bristles at tip; no hair-tufts, but a short subapical arm bearing one long spine; *lp* more truncate apically than in the other species.

LARVA.—Unknown.

DISTRIBUTION.—BURMA: type-locality *, as given above. ASSAM: Nongpoh *, Khasi Hills dist., vii. 1922 and iii. 1927 (*Barraud*).

Recorded from COCHIN CHINA (*Borel*).

172. **Heizmannia funerea** (Leicester), 1908.

Cul. Malaya, p. 252 (*Wyeomyia*) (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT ‡.—Distinguished from all other known Indian species by characters given in keys. ♂ hypopygium very similar to that of *H. indica*, but with slight differences in form of style.

LARVA §.—This has been described by Edwards and Given as follows:—" *Head* rounded, scarcely as broad as long,

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† Edwards 1922 *d*, p. 447; Barraud 1929 *b*, p. 263.
‡ Edwards 1922 *d*, p. 448; Barraud 1929 *b*, p. 263.
§ Edwards & Given 1928, p. 340.

pale in colour, except round occipital margin and mouth. Clypeal spines long and slender, not set on distinct tubercles; a small accessory hair external to each. Dorsal hairs placed well back from the front; *A* with about 15 plumose branches; *B* with 2–3 branches, placed in front of but a little external to *C*, which has about 10 branches; *d* smaller, but still rather large, with about 20 plumose branches arranged in a fan-shaped manner round a pear-shaped base; *e* small, 2–3-branched. Antennæ two-thirds as long as the head, somewhat curved and tapering, darkened on the outer half; shaft with a few very fine spicules; tuft of 4 branches placed about the middle; preapical bristles close to tip, one much longer than the other. Mouth-brushes normal, the constituent hairs simple. Mentum triangular; a rather large central tooth, on each side of which are first five closely set teeth, and then five more, shorter and more widely separated. *Thorax* with 3–4 almost simple hairs in the lateral tufts; no associated spines, and no definite plates. *Abdomen* with the lateral hairs mostly double, dorsal hairs inconspicuous. Comb a patch of about 15 scales, most of which are finely and evenly fringed all round, though a few have a long terminal point. *Anal segment* with a moderately large saddle, the posterior margin of which is fringed with little clumps of very fine setæ. Outer dorsal hair long and simple, inner dorsal hair double. Lateral hair rather long and simple. A small barred area present, with six long, double, non-plumose hairs; two small single hairs before the barred area. Siphon very dark, broadest a little before the middle, then rather strongly tapering; index about 3. No acus. Pecten composed of 5–9 simple teeth, reaching hardly more than one-third the length of the siphon; tuft represented by a single long hair placed a short distance beyond the last pecten-tooth. Valves small, of normal structure."

HABITAT.—Tree-holes.

DISTRIBUTION.—As regards India, this species is known from one ♀ only, from Meenglas, Jalpaiguri, N. BENGAL (*M. O. T. Iyengar*).

Known from MALAY PENINSULA (Kuala Lumpur and Singapore).

173. **Heizmannia indica** (Theobald), 1905.

Ann. Mus. Nat. Hung. iii, p. 115 (*Phoniomyia*) (♂). TYPE-LOC.: Singapore, 1902 (*Biró*). TYPE: ♂ in Nat. Mus. Hung., Buda Pest.

ADULT ♀ [*].—*Head*: mainly covered with purplish-black flat scales, a small silvery area on vertex, continued downwards between eyes. Antennæ, clypeus, palpi, and proboscis black. Proboscis unusually long, from 1¼–1½ times length of fore femur. *Thorax*: mesonotum with scutellum covered with greenish-blue broad scales with metallic lustre; *apn* more or less separated, with white scales on upper and anterior parts, dark scales below. Patches of silvery-white scales on pleuræ and coxæ. *Wings*: dark scaled, outstanding plume-scales on veins 2.1 and 2.2 rather narrow, but ligulate in shape. *Legs*: dark brown; mid-femur paler beneath; hind femur white along both surfaces from base nearly to knee, except along dorsal edge, which is dark for the whole length. *Abdomen*: bluish-black, with lateral triangular basal white markings not usually produced on to dorsum to form basal bands, as is the case in some other species.

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[*] Theobald 1907, p. 601; Leicester 1908, p. 253; Edwards 1922 *d*, p. 447; Barraud 1929 *b*, p. 265.

♂.—Proboscis unusually long and palpi quite short, as in ♀; last two flagellar segments of antennæ very long, as usual, rest short (about 2×1) *. *Hypopygium*: 9th sternite very large and hood-like, as long as coxite, with a few scales and short hairs on its distal portion. Form of style and " harpago " shown in fig. 74, **b**.

LARVA.—Undescribed.

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION.—Fairly common in EASTERN HIMALAYAS from 500′ (Sukna) up to 6–7,000′ (Kurseong, Darjeeling, etc.). Not known at present from other parts of Indian area, but is found in MALAY PENINSULA.

174. **Heizmannia covelli** Barraud, 1929.

Ind. Journ. Med. Res. xvii, p. 265 (♂ & ♀). TYPE-LOC.: Andaman Is., vii. 1926 (♂) (*Covell*); Sukna, N. Bengal, x. 1922 (allotype ♀) (*Barraud*). TYPE: co-type ♂ and allotype ♀ in Brit. Mus.

ADULT.—Differs from *H. chandi*, *greeni*, and *metallica*, to which it appears to be related, in structure of ♂ hypopygium, and in following characters present in both sexes:—Proboscis distinctly shorter than fore femur; mesonotal scales blackish, with a bronzy metallic sheen; scutellar scales

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* [In the key to the species of *Heizmannia* published by Edwards (1922 *d*) the antennæ of *H. indica* were stated to be alike in the two sexes, *i. e.*, with all the flagellar segents in ♂ subequal in length, the last two not elongate. This is true of the Malayan ♂ in the British Museum, assumed to be conspecific with the type from Singapore, of which the hypopygium was figured by Edwards. This Malayan ♂ may be abnormal as regards its antennæ, as it is identical in hypopygial structure with one in the British Museum from Kurseong (*M. O. T. Iyengar*), in which the antennæ are as described by Barraud.]

greenish-black, with a few silvery scales at apex of mid-lobe; *apn* approximated, but not touching behind head, with silvery-white scales anteriorly; outstanding plume-scales on veins 2.1 and 2.2 narrow but ligulate in shape. Abdomen marked with the usual lateral triangular basal silvery patches, with narrow white basal bands over dorsum on VI and VII in ♀. 3–4 *ppn* bristles, 1–2 lower mesepimeral. Last two flagellar segments of antenna of ♂ very long, as usual, terminal segment about twice length of penultimate; last two segments together a little more than twice length of first 11; segments 2–11 each only about twice as long as broad. Tarsal claws of fore and mid-legs of ♂ with a slender sharp tooth arising from base.

♂.—*Hypopygium* (fig. 74, e): coxite short and rounded, with two large tufts of hairs arising from inner side towards base; subapical lobe with a single stout pointed process. Style less expanded apically than in several other species. Harpago of characteristic shape.

LARVA.—Not known with certainty. Some specimens sent from Rangoon, thought to be this species, show the following characters:—Length about 5 mm. *Antenna* comparatively long, darkened on apical ½; shaft rather more than ½ length of head, with small, thin spines scattered along its length; hair-tuft of about 4 branches at middle of shaft; 2 subapical bristles a little below tip; terminal papilla very long. *Frontal hairs*: *A* missing; *B* with few fairly long branches; *C* and *d* with fairly numerous fine branches. Hair *C* lies some distance behind *B*; *d* internal to, and almost level with, *B*. Preclypeal spines fine and long. Lateral hairs of *thorax* moderately well developed; meso- and metapleural tubercles with rather small, but distinct, thorn-like spines. Lateral hairs of *abdomen* with 2–3 long branches. Comb of about 12 fringed teeth, each ending in a number of fine points, teeth apparently arranged more or less in two rows. *Siphon* not quite 1 mm. long, tapering from middle to apex. Pecten of 5–8 moderate-sized pointed teeth, each with several long, but fine, denticles, which are divided from main tooth nearly to base. Hair-tuft of 3–5 fine branches, base of tuft before middle of tube. *Anal segment* with fairly large chitinous saddle, long, single, lateral hair and small fan-plate; *isc* of 3–4 long branches; *osc* single and long, as usual. Fan of few hairs.

HABITAT.—Tree-holes and bamboo-stumps.

DISTRIBUTION.—ANDAMAN IS. *, and N. BENGAL, Sukna *, type-localities, as given above. BURMA: Rangoon *, 1930 (*Feegrade*).

Not known from elsewhere.

175. **Heizmannia viridis** Barraud, 1929.

Ind. Journ. Med. Res. xvii, p. 266 (♀). TYPE-LOC.: N. Kanara, Yellapur, x. 1921 (*Barraud*). TYPES: co-type ♀ in Brit. Mus.; two co-types in M.S.I. coll., Kasauli.

ADULT.—Most nearly resembles *H. covelli* and *H. metallica*, but differs as indicated in key. Wing about 3 mm.

♀.—*Head*: a median patch of flat silvery scales on vertex in front, continued downwards between eyes; remainder of dorsal surface covered with flat blue-black scales; a patch of silvery scales low down at each side. Antennæ, clypeus, palpi, and proboscis black, the last about equal in length to fore femur. *Thorax*: mesonotal scales with bright green metallic lustre, contrasting with blue-black scales on head and abdomen. Scutellar scales flat, with green or greenish-blue metallic lustre, a few white scales in middle of centre lobe: *apn* large and fairly closely approximated, covered with silvery-white scales, except on lower part, where scales are black. A well-marked tuft of hairs on postnotum. Integument of pleuræ black, with patches of silvery-white scales; 3–4 *ppn* bristles and 1 lower mesepimeral. *Wings*: dark scaled; outstanding plume-scales on veins 2.1 and 2.2 rather narrow, but ligulate in shape. *Legs*: deep bronzy-brown, fore and mid-femora paler posteriorly; hind femora more extensively pale on both surfaces, dark along dorsal edge and around knee-joint. *Abdomen*: blue-black, with the usual basal triangular white markings laterally, and more or less complete narrow basal bands over dorsum on terminal segments.

♂ and LARVA.—Unknown.

DISTRIBUTION.—NORTH KANARA: Yellapur *, type-locality, as given above. BOMBAY DECCAN: Nagargali *, viii. 1921 (*Barraud*). MALABAR COAST *, x. 1915 (*Khazan Chand*).

Not known from elsewhere.

176. **Heizmannia himalayensis** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 290 (♂). TYPE-LOC.: Darjeeling, vii. 1918 (*Kemp*). TYPE: ♂ in Ind. Mus.

ADULT †.—Distinguished from other species on following characters:—Hind femur entirely pale on basal ½, even along dorsal edge. Mesonotal scales black, with bluish-black metallic lustre. A large silvery patch covering mid-lobe of scutellum and extending on to mesonotum in middle. Proboscis about length of fore femur; *apn* slightly separated, with silvery-white scales covering the larger part. Outstanding plume-scales on veins 2.1 and 2.2 rather narrow but ligulate. Abdomen with basal triangular silvery patches

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† Barraud 1929 *b*, p. 267.

laterally, and narrow basal white bands over dorsum on segments IV–V in ♀. Larger claw of fore tarsi of ♂ with a long slender tooth.

♂.—*Hypopygium* (fig. 74, **a**) : style characteristic, with very large expansion on apical ½. Harpago with hairy stem, and processes resembling petals of a flower.

LARVA.—The following details are described from one incomplete larval skin from Koti, near Kalka, from which the resulting ♀ has been preserved :—*Antenna* pale except at extreme base, of moderate length, considerably shorter than in *covelli* and *funerea*, tip about level with ends of longer mouth-brush hairs in the mounted skin ; shaft quite smooth ; hair-tuft of 2 branches, nearer apex than base ; terminal papilla quite small. *Frontal hair A* of about 10 branches ; *B* and *C* each of 3 fairly long branches ; *C* standing directly behind, but some distance from, *B*. Mouth-brushes of moderate size, hairs simple. Preclypeal spines pale in colour, very long and tapering. Mentum triangular, with 11–12 teeth either side of central one. Hairs on *thorax* and *abdomen* moderately developed. Comb of a few large sharp teeth, each tooth with lateral fine hairs towards base. *Siphon* about 0·8 mm. long : a dark ring at base ; no acus. Pecten of only 4–5 fairly large sharp teeth, each with 2–3 large basal lateral denticles. Hair-tuft of 3 branches, slightly nearer base than apex. *Anal segment* almost enclosed in chitinous ring ; *lh* of 2 rather long branches ; *isc* of 2 branches.

HABITAT.—Tree-holes, and bamboos.

DISTRIBUTION.—EASTERN HIMALAYAS : Darjeeling *, type-locality, as given above ; Kurseong *, 6,000′ Darjeeling dist., viii. 1928 (*Sobha Ram*). NORTH BENGAL : Sukna *, Darjeeling dist., 500′, ix. 1922 (*Barraud*), and viii. 1928 (*Sobha Ram*). WESTERN HIMALAYAS : Koti *, near Kalka (Kalka-Simla road), *c*. 4,000′, vii. 1923 (*Barraud*).

Not known from elsewhere.

177. **Heizmannia metallica** (Leicester), 1908.

Cul. Malaya, p. 251 (*Wycomyia*) (♀). TYPE-LOC. : Bukit Kutu, Malay Penin. (*Leicester*). TYPE : ♀ in Brit. Mus.

ADULT †.—Very similar to *H. covelli* and *viridis*, but the mesonotal scales have a deep bluish-metallic lustre (not green or bronzy). Proboscis slightly longer than fore femur ; *apn* large and nearly touching behind head, with silvery-white scales on outer anterior parts. Outstanding plume-scales on veins 2.1 and 2.2 ligulate. Abdomen with the usual large basal triangular silvery patches. Antenna of ♂ with first 11 flagellar segments very short, scarcely longer than

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† Edwards 1922 *d*, p. 448 ; Barraud 1929 *b*, p. 267.

broad, each with few long hairs, last two segments with long and dense pubescence and very long basal hair-whorls.

♂.—*Hypopygium* (fig. 74, **d**): coxite without any large dense tufts of hairs; subapical lobe with a single strong spine-like process. Harpago represented by two processes, one of which is very transparent, with broad stem and leaf-like blade.

LARVA.—Unknown.

HABITAT.—Tree-holes.

DISTRIBUTION.—MALABAR COAST: Pudupadi *, x. 1915 (*Khazan Chand*). EASTERN HIMALAYAS: Kurseong, Darjeeling dist., 5,000′, ix. 1909 (*Annandale*).

Known also from MALAY PENINSULA.

178. **Heizmannia chandi** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 291. TYPE-LOC.: Pudupadi, Malabar Coast, x. 1915 (*Khazan Chand*). TYPE: ♂ and allotype ♀ in Brit. Mus.

ADULT †.—Resembles *H. greeni* and *complex* in having scales on veins 2.1 and 2.2 very narrow (linear), but differs in other respects as indicated in key. Also closely resembles *H. viridis*, differing in the narrower wing-scales.

♂.—*Hypopygium* (fig. 74, **c**): coxite with a collection of rather short hairs, all about same length, on inner side; harpago with several leaf-like expansions representing the blade; style with an elbow-like projection near base on outer side.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

179. **Heizmannia greeni** (Theobald), 1905.

Journ. Bomb. Nat. Hist. Soc. xvi, p. 247 (*Wyeomyia*) (♂ & ♀). TYPE-LOC.: Peradeniya, Ceylon, i. & ii. 1902 (*Green*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—Proboscis about length of fore femur; mesonotal scales with dark blue-metallic lustre; *apn* with white scales only along anterior edge and laterally; outstanding plume-scales on veins 2.1 and 2.2 very narrow (linear); basal white, triangular, lateral patches on abdomen, not forming bands over dorsum.

♂.—*Hypopygium*: subapical lobe of coxite with two strong spine-like processes; long twisted hair-tufts on inner side of coxite.

LARVA.—Unknown.

DISTRIBUTION.—MALABAR COAST *, x. 1915 (*Khazan Chand*). CEYLON: type-locality, as given above.

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† Barraud 1929 *b*, p. 268.

‡ Theobald 1907, p. 597; Edwards 1922 *d*, p. 449; Barraud 1929 *b*, p. 268.

Genus **HÆMAGOGUS** Williston, 1896.

Trans. Ent. Soc. Lond. 1896, p. 271. Genotype, *H. splendens* Will.

Two Indian mosquitoes have been provisionally referred to this tropical American genus, but, as no males of the Indian species have yet been obtained, their true generic position is not definitely settled *. In general appearance they resemble the species of *Heizmannia*, but there are no hairs on the postnotum.

ADULT ♀.—Densely scaly mosquitoes; general coloration black, with brilliant silvery markings, more definitely metallic than in *Heizmannia*: *apn* large, collar-like, closely approximated behind head. Proboscis slender, distinctly longer than fore femur; palpi not more than $\frac{1}{6}$ length of proboscis. Larger part of dorsum of thorax without bristles; none present even immediately in front of scutellum.

♂ and LARVA.—Unknown.

DISTRIBUTION and BIONOMICS.—Both Indian species appear to be rare and confined to heavily forested localities. The ♀♀ are day-flying, and most probably suck human blood.

180. **Hæmagogus discrepans** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 291 (♀). TYPE-LOC.: Pudupadi, Malabar Coast, x. 1915 (*Khazan Chand*). TYPE: ♀ in Brit. Mus.

ADULT †.—A medium-sized dark mosquito with silvery markings. Wing 3·2–3·5 mm.

♀.—*Head*: a large patch of silvery flat scales, with bluish tint, on vertex, a silvery patch at each side, remainder of head covered with flat black scales, except for very few upright scales far back on nape. Antennæ, clypeus, palpi, and proboscis black. Palpi about $\frac{1}{9}$ length of proboscis. *Thorax*: integument of mesonotum black, covered with deep bronzy scales, for the most part fairly narrow, but broader ones posteriorly; a few bristles on anterior margin and over wing-roots. Mid-lobe of scutellum densely clothed with flat silvery scales, some black scales apically; lateral lobes with dark scales; *apn* large, closely approximated behind head, covered outwardly with flat silvery scales; *ppn* bare. A patch of flat silvery scales below margin of mesonotum, in front of wing-root; another patch covering larger part of sternopleura and upper part of mesepimeron; other patches on propleuræ and coxæ; 3 or 4 *ppn* bristles or

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* [A third Oriental species (*achætæ* Leic.) is also referred here, and is likewise known only in the female.]

† Barraud 1929 *b*, p. 269.

2 postspiracular; 1 or 2 lower mesepimeral and 3 or 4 upper mesepimeral. Integument of postnotum and pleuræ almost black. *Wings*: dark scaled; outstanding plume-scales rather narrow; membrane with bronzy-green or blue reflections. *Legs*: brownish-black; mid-femur pale posteriorly on about basal ½, hind femur pale on both sides, except dorsally, on about basal ½. Tarsal claws of fore and mid-legs toothed. *Abdomen*: greenish-black, with large basal lateral silvery patches, usually produced on to dorsum of segments V–VII, and forming narrow basal bands. Segment VIII and cerci small, tip of abdomen square-ended in side view.

♂ and LARVA.—Unknown.

HABITAT.—Bamboos (*Barraud*).

DISTRIBUTION.—MALABAR COAST: type-locality *, as given above. BOMBAY DECCAN: Nagargali *, viii. 1921 (*Barraud*). N. KANARA: Yellapur *, x. 1921 (*Barraud*).

Not known from elsewhere.

181. **Hæmagogus tripunctatus** (Theobald), 1908.

Rec. Ind. Mus. ii, p. 288 (*Stegomyia*) (♀). TYPE-LOC.: Assam, Lushai Hills, vi. 1904 (*Macleod*). TYPE: ♀ in Ind. Mus.

ADULT ♀ †.—Very similar to *H. discrepans*, described above, but differing as follows:—Hind femur pale on anterior, or outer, side nearly to the knee: tarsal claws simple: outstanding wing-scales rather broad.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from the type-locality.

Genus **ARMIGERES** Theobald, 1901.

M.C. i, p. 322. Genotype, *A. obturbans* Walk.

(For synonymy see under subgenera.)

ADULT ‡.—Medium-sized to rather large mosquitoes, not usually highly ornamented, but otherwise resembling *Aëdes* (subgenus *Stegomyia*) in general appearance and structure. Scales of head broad and flat, a few upright scales on nape, at least in some species, scutellar scales all broad and flat. Proboscis rather stout, slightly curved downwards towards tip, the curved part somewhat laterally flattened. Palpi of ♂ as long as, or longer than, proboscis, of 3 segments, the last two of which are long, slender, turned upwards, and without hair-tufts. Palpi of ♀ of variable length, from about ¼ to ⅕ length of proboscis. Antennæ of ♂ plumose, the plume-hairs projecting fairly evenly round shaft. Abdomen of ♀ somewhat tapering, segment VIII partially retractile, cerci short.

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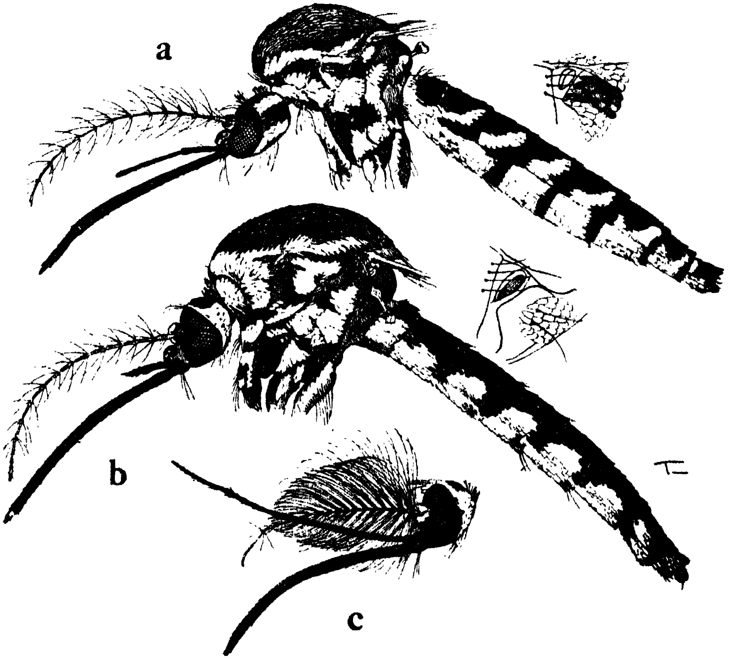
† Theobald 1910 *b*, p. 182; Barraud 1929 *b*, p. 269.
‡ Barraud 1927 *b*, p. 534; Edwards 1932, p. 182.

Coxite of ♂ hypopygium with lobe on inner surface bearing spines. Style of variable form, but usually with spines along apical part or at tip. Phallosome divided into small lateral plates with teeth. Paraprocts without teeth or hairs at crown. The only character distinguishing the genus, as a whole, from *Aëdes* appears to be the form of the proboscis.

Pupa.—As in *Aëdes*.

Larva.—Resembles *Aëdes* except in absence of a pecten on siphon. *A. flavus* is distinct from all other known Culicine larvæ in having a conspicuous ventral chitinised plate on the anal segment separate from the dorsal saddle. Descriptions of this, and of the five other known larvæ, are given in the following pages. Of these five the author has seen only a few specimens of three, and a reliable key cannot be given at present. [In all known larvæ of the genus except the aberrant *A. treubi* the antennæ are short, with smooth shaft; frontal hairs rather small and placed far forwards; mandibles large, with strong black teeth; comb-scales in a patch or very

Fig. 75.

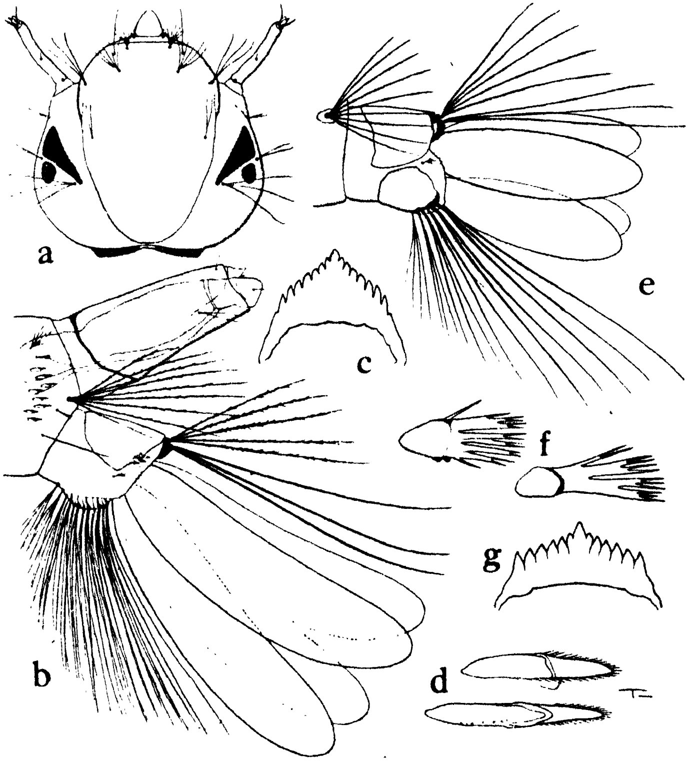


Adult characters of *Armigeres*: **a**, *omissus*, ♀, side view (legs and wings omitted), with enlargement of postspiracular area, showing scales; **b**, *obturbans*, ♀, as in **a**; **c**, *obturbans*, ♂, head.

irregular row; siphon very short and with tracheæ within siphonal tube very wide; anal fan poorly developed, no ventral tufts on anal segment before the fan; papillæ very large and sausage-shaped.]

DISTRIBUTION and BIONOMICS.—The genus is mainly Oriental, a few species extend into the Australian region, and one as far as Japan. Of about 30 known species, 13 have, so far, been found in India. These occur chiefly in forested localities where there is a heavy rainfall, and the larvæ live chiefly in bamboos, coconut-shells, etc. Those of *A. obturbans* sometimes occur in tree-holes, cement sinks in connection with rain-water channels, and in very foul domestic collections of water. The eggs are usually laid singly, but *A. flavus* has been observed on more than one occasion with a mass of eggs attached to its hind leg, with the object, it is thought,

Fig. 76.



Larval structures of *Armigeres*: **a–d**, *obturbans* (head, tail-end, mentum, comb-scales); **e–g**, *flavus* (anal segment, comb-scales, mentum).

of introducing these to water in bamboo-stems, through a small hole. The ♀♀ are vicious blood-suckers, and attack man both in the day and at dusk.

Subgenus **ARMIGERES** Theobald, 1901.

M.C. i, p. 322. Genotype, *A. obturbans* Walk.

Desvoidya Blanchard, 1901, C.R. Soc. Biol. liii, p. 1046, nom. nov. for *Armigeres*.

Blanchardiomyia Brunetti, 1912, Rec. Ind. Mus. iv, p. 440, nom. nov. for *Desvoidya*.

Desvoidea Theobald, 1903, M.C. iii, p. 134, *lapsus* for *Desvoidya*.

The following characters distinguish this subgenus from *Leicesteria* :—Postspiracular area with several bristles, and some white scales on this part posteriorly, but no black scales ; mesonotum not distinctly produced over the head ; palpi of ♀ less than $\frac{1}{3}$ length of proboscis. One lower mesepimeral bristle usually present (absent in *Leicesteria* except in *flavus*). Style of ♂ hypopygium with close-set spines along about $\frac{1}{2}$ its length.

Key to Adults *.

1. Abdominal tergites with median apical yellow markings .... *theobaldi*, p. 319.
Abdominal tergites without such markings. 2.
2. Mesonotum with a pair of well-defined submedian golden lines, and a curved line of similar scales over each wing-root ; lateral white markings on abdominal tergites produced on to dorsum .... *aureolineatus*, p. 319.
Mesonotum without a pair of submedian golden lines (though there may be a single median yellowish line) ; lateral white markings on abdominal tergites not produced on to dorsum .... 3.
3. Abdominal sternites III–VI with wide apical black bands ; pale margin of mesonotum usually yellowish ; palpi of ♀ about $\frac{1}{3}$ length of proboscis ; basal lobes of coxite of ♂ usually with 2 straight spines which are round and not flattened ; tip of style not reaching to basal lobe....... *obturbans*, p. 314.
Abdominal sternites III–VI variously marked (see description of varieties below) ; scales on margin of mesonotum usually white (or else no distinct pale border present) ; palpi of ♀ about $\frac{1}{4}$ length of proboscis ; basal lobe of coxite of ♂ with 3 curved flattened spines ; tip of style reaching to basal lobe .... *kuchingensis*, p. 317.

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* [In addition to the four species already recorded as occurring in India, it is probable that some others occur in Burma, as about ten have been found in the Malay Peninsula and Archipelago. Of these *A. malayi* is one of the commonest and most widely distributed ; it is distinguished from *obturbans* by hypopygial structure and by presence of white scales on the clypeus.]

182. **Armigeres (Armigeres) obturbans** (Walk.), 1860*.

Proc. Linn. Soc. Lond. iv, p. 91 (*Culex*) (♀). TYPE-LOC.: Amboyna (Moluccas) (*Wallace*). TYPE: ♀ in Brit. Mus.

Culex ventralis Walker, 1861, Proc. Linn. Soc. Lond. v, p. 144 (♀). TYPE-LOC.: Celebes (*Wallace*). TYPE: ♀ in Brit. Mus.

Culex subalbatus Coquillett, 1898, Proc. U.S. Nat. Mus. xxi, p. 302 (*Culex*) (♀). TYPE-LOC.: Japan. TYPE: U.S. Nat. Mus.

Armigeres panalectoros Giles, 1902, Handbook, 2nd ed. p. 386 (♂ & ♀). TYPE-LOC.: Calcutta (*Giles*). TYPE: ♂ & ♀ in Ind. Mus.

ADULT † (fig. 75).—Rather large species. Wing 4–5 mm.

♀.—*Head*: a border of flat creamy or white scales to eyes, narrow in middle, widening out at sides; a patch of broad white scales in middle of vertex, remainder covered with bluish-black flat scales; some upright scales on nape. Tori dark brown or black, covered with small broad pale scales; flagellum and hairs of antenna brown. Clypeus black, with greyish sheen. Palpi and proboscis brownish-black; palpi about $\frac{1}{3}$ length of proboscis. *Thorax*: a border of creamy or yellow scales to mesonotum from wing-roots round front margin; dorsum covered with dark brown narrow scales, with, in many specimens, lighter scales intermixed, sometimes forming a fairly well-defined median line from front margin to scutellum, and curved lines laterally. Scutellar scales broad and flat, varying in colour from black to pale brown. Postnotum dark brown; *apn* with flat white scales anteriorly, dark scales posteriorly ; *ppn* with narrow scales on upper part, usually white or yellowish, but in some specimens dark brown ; broader white scales on lower part, and patches of similar scales on pleuræ and coxæ. A few bristles and a small patch of white scales a short distance behind anterior spiracle. *Wings*: dark scaled. *Legs*: brownish-black ; hind femur white on outer side from base to knee-joint, usually a small pale knee-spot dorsally on mid-femur ; all legs pale when seen from behind ; tibiæ and tarsi not marked with pale rings. *Abdomen*: brownish-black dorsally, lateral white markings on tergites, hardly, if at all, visible dorsally. Sternite II white scaled, III–VI white at base, with black

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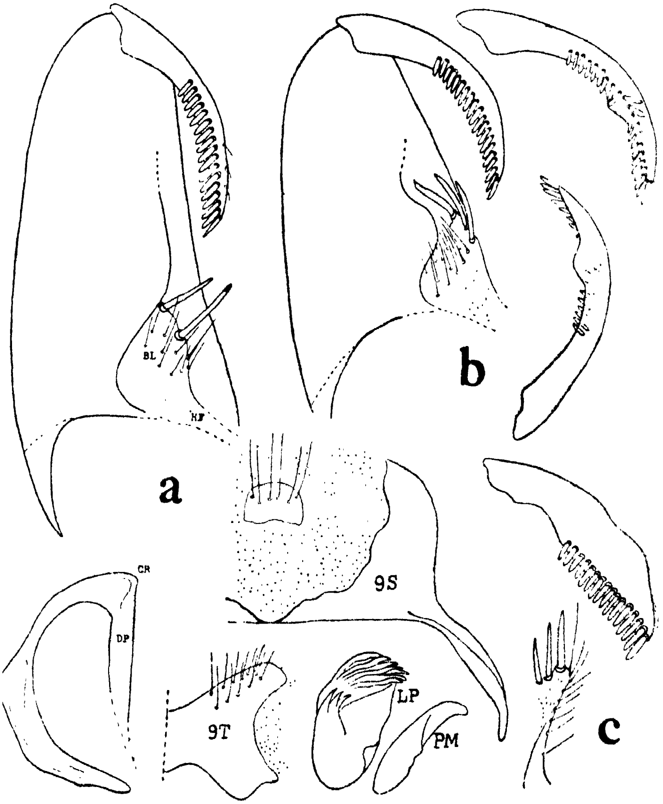
* I have assumed that the species which is generally common in India is the same as the one described by Walker as *C. obturbans* and *C. ventralis*, from Amboyna and Celebes, but there would seem to be some doubt on the point. There is at least one other species (*A. kuchingensis*) which is variable, and in some forms resembles *obturbans* closely. The latter is far less common in Upper Assam. Specimens sent to me as *A. obturbans*, from the Philippine Islands, proved to be *A. kuchingensis*, and I am in doubt as to whether *Desvoidea fusca* var. *joloensis*, described by Ludlow from those islands (1904 *a*, p. 236), should be given as a synonym of *A. obturbans* or not. [If it should be shown that the species here called *obturbans* does not occur in Amboyna or Celebes, it should, perhaps, take the name *subalbatus* Coq., the application of which is not in doubt, as all specimens from China and Japan appear to be *A. obturbans* as here described, having the same hypopygial structure and unequal middle claws of ♂. On the other hand, it is possible that the name *joloensis* should replace *kuchingensis*, as this appears to be a common Philippine form. The types of *joloensis* were from the island of Jolo, south of Mindanão, P.I., and are in the U.S. Nat. Mus. Specimens in the British Museum received from Miss Ludlow as *joloensis*, and agreeing with the descriptions, are labelled as from Ilo-Ilo, Panay, P.I.; these have the ♂ hypopygium as in *kuchingensis*, and colouring almost as in var. *durhami*, sternites II and VI being almost all white, III–V with broad black apical bands.]

† Leicester 1908, p. 75; Edwards 1917, p. 205; 1921 *c*, p. 326; 1924, p. 368; Brug 1924 *b*, p. 46; Barraud 1927 *b*, p. 537; Martini 1930, p. 257.

Fig. 77.



♂ hypopygial structures of *Armigeres*, subgenus *Armigeres*. **a**, *obturbans* (with details) ; **b**, *kuchingensis* (with style in different positions) ; **c**, *aureolineatus* (style and basal lobe). Lettering as on p. 4.

apical bands, usually broad and all about same width; VII dark at base, with narrow subapical white band; tergite VIII usually pale.

♂.—Palpi longer than proboscis by about ½ length of apical segment. Antennæ plumose. Markings as in ♀. Claws of middle leg rather markedly unequal (though larger claw is much smaller than those of front leg). *Hypopygium* (fig. 77, **a**): *bl* with 2 (occasionally 3) fairly strong, straight spines, pointing inwards towards opposite coxite. Style slightly curved, with about 18 short teeth along rather more than apical ½; tip does not reach basal lobe when style is depressed against coxite.

LARVA * (fig. 76, **a–d**).—Described from several skins definitely identified as this species by examination of hypopygia of resulting ♂♂. *Antenna* short and thick, about 6–7 times length of greatest width; shaft bare except for one very small hair at about middle, sometimes a little nearer base than apex. *Frontal hair A* usually of 3 fairly long branches; *B*, *C*, and *d* placed far forward, *d* being most anterior and slightly external and dorsal to preclypeal spines; *B* external and slightly posterior to *d*; *C* slightly internal and posterior to *B*; *d* fairly large and usually with 6 fine branches; *B* single and long, fairly stout on basal part, fine apically; *C* usually of 3 fairly long branches; *e* fine and single or bifid. Preclypeal spines arising from tubercles, pale, very long, apical part fine and hair-like. Median hairs of mouth-brushes slightly curved, minutely serrated along one side. Mentum triangular, 6–8 teeth either side of central one. Lateral hairs of body fairly well developed. Those on *thorax* many-branched, some arising from large chitinised tubercles, without spine-like processes, except a small one on larger metathoracic (metapleural) tubercle. Number of branches in dorso-lateral tufted hairs on first five *abdominal segments* are respectively 7–10, 5–8, 2–3, 2, 2 (in *A. kuchingensis* the corresponding numbers are 4–6, 3–4, 2–3, 2, 2). Slightly ventral to the tufted hairs referred to there is another smaller hair, which on segments I and II is usually fine and divided into several branches in *A. obturbans*, whereas in *A. kuchingensis* it is larger, and either single or 2-branched. Comb of 6–11 strong teeth, with large basal and smaller apical parts, the latter bluntly pointed and fringed with hairs on both sides to apex. One stout subplumose hair slightly ventral to comb. Subsiphonal tuft large, with about 8–10 long subplumose branches. *Siphon* short and wide, about 1¾ to twice length of width at base (when pressed flat, width across base is about equal to length). No pecten. Hair-tuft

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* Brug 1924 *a*, p. 439; Senior-White 1927, p. 74; Edwards 1927, p. 119; Martini 1930, p. 258.

of 2 fine inconspicuous branches, at about ⅚ of length from base. Tracheæ within siphon much swollen, nearly filling tube on basal ¾, some perforations in tracheæ near base of tube. *Anal segment* with fairly large chitinised saddle ; *lh* inconspicuous, lying slightly below posterior corner of saddle, with 4–5 fine branches ; *osc* of 4–5 long barbed branches all about same length, *isc* of 3 similar branches. Both pairs of papillæ very long, sausage-shaped, with rounded ends. Fan not large, of about 10 hairs, each divided into several branches, longest hairs about length of subdorsal pairs : no definite fan-plate.

HABITAT.—Tree-holes, bamboos, domestic collections of water, often very foul.

DISTRIBUTION.—The commonest species of the genus. Occurs from the PUNJAB to ASSAM and BURMA, and throughout PENINSULAR INDIA to CEYLON.

Known from MALAY PENINSULA (♂♂ examined by Author) : CHINA, JAPAN, SUMATRA (♂♂ examined by Editor). Further distribution doubtful (see footnote, p. 314).

183. **Armigeres (Armigeres) kuchingensis** Edwards, 1915.

Bull. Ent. Res. v, p. 283 (♂ & ♀). TYPE-LOC. : Kuching, Sarawak, vii. 1914 (*Moulton*). TYPE : ♂ & ♀ in Brit. Mus.
var. *durhami* Edwards, 1917 (*Armigeres durhami*), Bull. Ent. Res. vii, p. 206 (♂ & ♀). TYPE-LOC. : Bukit Kutu, Malay Penin. 3,300′, v. 1903 (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.
var. *nongpohensis* Barraud, 1927, Ind. Journ. Med. Res. xiv, p. 539.
var. *shillongensis* id., ib.
var. *dibrugarhensis* id., ib.

ADULT *.—Variable in markings of mesonotum and in extent of white scaling on abdominal sternites ; in some forms resembles *A. obturbans* so closely that it is often difficult to separate ♀♀ with certainty. Scaling of head and appendages, markings of pleuræ, and coloration of legs as in *A. obturbans*, but palpi of ♀ about ¼ length of proboscis instead of about ⅓. Abdominal sternite VII, in all forms, black scaled, with narrow subapical white band, as in *A. obturbans*. Claws of middle legs of ♂ equal in size, both small, as in most other species of the genus.

Type-form.—Mesonotum covered with yellowish-brown scales ; no distinct pale margin. Abdominal sternites II–VI white scaled, without apical black bands. In the ♂ mesonotal scaling is often darker, with indications of pale margin, thus being intermediate between this form and var. *nongpohensis*, described below.

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* Barraud 1927 *b*, p. 538. The type-form and the four forms described as varieties represent types of individual variation only ; intermediate forms frequently occur.

var. *nongpohensis*.—Resembles *A. obturbans* in scaling of mesonotum, but pale border is white, not creamy or yellow. Sternites marked as in type-form.

var. *shillongensis*.—Mesonotum marked as in *nongpohensis*. Abdominal sternites V and VI with narrow apical black bands; III and IV without complete apical black bands, being almost entirely white.

var. *durhami*.—Mesonotum marked as in var. *nongpohensis*. Abdominal sternites III–VI with black apical bands, those on III and IV much wider than those on V and VI.

var. *dibrugarhensis*.—Closely resembles *A. obturbans*, but pale margin of mesonotum is white, and black bands on venter usually narrow.

♂.—*Hypopygium* (fig. 77, **b**): very similar to that of *A. obturbans*, but differing as follows:—*bl* with 3 (occasionally 4) flattened curved spines which bend towards anal segment; in dissected and flattened preparations these spines curve inwards on to the coxite, and not outwards as in *A. obturbans*. Coxite shorter than in *obturbans*; style very similar, but tip reaches to basal lobe when style is depressed against coxite. In some specimens there is a swelling on the inner side of style (seen occasionally also in *obturbans*).

LARVA (described from skins definitely identified as this species by examination of hypopygia of resulting ♂♂).—Very similar to *A. obturbans*, but the following small differences have been found in the material available:—Number of branches in dorso-lateral tufted hairs on first five abdominal segments are, respectively, 4–6, 3–4, 2–3, 2, 2 (the corresponding numbers in *A. obturbans* are 7–10, 5–8, 2–3, 2, 2). Slightly ventral to the tufted hairs referred to there is another, rather smaller, hair, which, on segments I and II in *A. kuchingensis*, is long, fairly stout, and either single or 2-branched. In *A. obturbans* this hair is usually smaller, finer, and divided into several branches. Distance between frontal hairs *B* and *C* more than twice that between *B* and *d* (in *obturbans* the three hairs are about equidistant). Comb-teeth, when seen flat, with wide, frayed, apical margin, not bluntly pointed, as in *obturbans*. (This last character may not be entirely reliable, as the teeth vary in shape, and may have a very different appearance when not mounted flat. It appears, however, that in *kuchingensis*, at least, some of the teeth have a wide, frayed, rounded tip, whereas this appearance is seldom seen in *obturbans*.)

HABITAT.—Bamboos.

DISTRIBUTION.—Common in ASSAM, where the type-form, the four varieties referred to above, and intermediate forms all occur. The type-form is found chiefly during the cold weather or more or less dry season, the other varieties being found during the rains. Of the four varieties, all except var. *dibrugarhensis*, occur chiefly on the hills; var. *nongpohensis* has also been taken in the EASTERN HIMALAYAS, Kurseong, ix. 1922 (*Barraud*).

Specimens from Nagargali, BOMBAY DECCAN, viii. 1921 (*Barraud*), and from the ANDAMANS, ix. 1911 (*Christophers*), resemble var. *durhami*.

184. **Armigeres (Armigeres) theobaldi**, nom. nov.

Stegomyia crassipes Theobald (nec v. d. Wulp), M.C. i, p. 320, 1901.
Desvoidea apicalis Theobald, 1910 (nec Theobald, 1908), Rec. Ind. Mus. iv, p. 5 (♀). TYPE-LOC.: Balighai, near Puri, Orissa, x. 1908 (*Annandale*). TYPE: ♀ in Ind. Mus.

ADULT ♀ †.—A large yellowish species with median apical yellow markings on abdominal tergites, and lateral white patches, not visible dorsally; venter white scaled. Distinguished from *A.* (*L.*) *flavus*, which it resembles in general appearance, by the shorter palpi and unbanded tarsi, by absence of black scales behind anterior spiracle, and by presence of white scales and bristles in this position.

Palpi about $\frac{1}{5}$ length of proboscis. Clypeus dark brown, with a number of white scales on each side. Mesonotum covered with dark brown narrow scales, and with a border of yellowish scales all round margin. Legs very similar to those of *A. obturbans*, but tibiæ and tarsi yellowish when viewed from certain angles.

♂ and LARVA.—Unknown.

DISTRIBUTION.—ORISSA: type-locality *, as given above; Singhbhum *, 1923 (*Wats*). N. KANARA: Karwar, 1902 (*Cogill*). BURMA: Thayetmyo, viii. 1893 (*Watson*) ‡. ASSAM: Cherrapunji, 18. x. 1920 (*Senior-White*).

Not known from elsewhere.

185. **Armigeres (Armigeres) aureolineatus** (Leicester), 1908.

Cul. Malaya, p. 79 (*Desvoidya*) (♂ & ♀). TYPE-LOC.: Ampang, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT §.—Distinguished by golden lines on thorax, as noted in key. Abdominal markings resemble those of some species of subgenus *Leicesteria*. Sternites III–VI with narrow black apical bands. Tibiæ and tarsi dark brown, without pale bands.

♂.—*Hypopygium* (fig. 77, **c**): *bl* with 3 strong spines. Style rather wide, with comb of 15 or 16 stout teeth along a little more than apical $\frac{1}{2}$. A conspicuous tuft of hairs at apex of coxite near base of style.

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† Barraud 1927 *b*, p. 538.
‡ Described by Theobald (1901) in error as *crassipes* v. d. W.
§ Edwards 1917, p. 205; Barraud 1927 *b*, p. 541.

LARVA †.—Apparently very similar to that of *A. obturbans*, but according to Senior-White's figure there are fewer teeth in the comb (5 or 6 are shown), and the siphon-tube is a little longer. In his figures of these larvæ the subposterior siphonal hair and antennal hair are not shown, and one pair of frontal hairs (*C*) has been omitted from the figure of *A. obturbans* larva, so that a comparison on these points is not possible.

HABITAT.—Coconut-shells, etc.

DISTRIBUTION.—N. KANARA: Karwar *, ix. 1921 (*Barraud*). MALABAR COAST *, x. 1915 (*Khazan Chand*). CEYLON: Colombo, 1913 (*James*); Suduganga, xii. 1919 (*Senior-White*).

Known also from MALAY PENINSULA, COCHIN CHINA, and BORNEO.

Subgenus **LEICESTERIA** Theobald, 1904.

Entom. xxxvii, p. 211. Genotype, *L. longipalpis* Leic.

Chætomyia Leicester, 1908, Cul. Malaya, p. 100. Genotype, *L. flava* Leic.

Brevirhynchus Theobald, 1908, Rec. Ind. Mus. ii, p. 293. Genotype, *B. magnus* Theo.

Leicesteriomyia Brunetti, 1912, Rec. Ind. Mus. iv, p. 452, nom. nov. for *Chætomyia*.

Distinguished from subgenus *Armigeres* as follows:—No postspiracular bristles, but this area with flat black scales anteriorly and white scales posteriorly. Palpi of ♀ from about ½ to about ¾ length of proboscis. Mesonotum more or less produced over the head and in some species narrow, and laterally compressed. Style of ♂ with a group, or transverse row, of spines at the tip, and a small basal lobe on inner side of coxite bearing spines or processes.

A. flavus is peculiar in having a few scales and minute hairs on postnotum, one or two lower mesepimeral bristles, and unusually short hind tibiæ.

Key to Adults ‡.

1.	Hind tarsi with narrow pale rings (sometimes faint)	2.
	Hind tarsi entirely dark	6.

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† Senior-White 1927, pl. vii.

‡ [Four Malayan species have not yet been found in the Indian region, but may occur. These are :—(1) *dolichocephalus* Leic., resembling *annulitarsis*, but without scales on clypeus and tarsal rings faint or absent, ♂ hypopygium with 7 spines on style, 4 on *bl*; (2) *cingulatus* Leic., resembling *longipalpis*, but ♂ style without membranous expansion and no scale-patch on coxite, style short, with 4 spines longitudinally placed and some scales; (3) *pectinatus* Edw., resembles *digitatus* in colouring, but ♂ style more expanded at tip, with 9 spines, *bl* with 2+2 spines, coxite more hairy; (4) *pendulus* Edw., with abdomen unbanded and without yellow markings, hind tarsi very faintly ringed, hypopygium small and pendulous, with only 3–4 spines on style and dense scale-patch on coxite, 9th sternite unusually large.]

2.	Abdominal tergites with median apical yellow markings; postnotum with a few scales and some minute hairs; one or two lower mesepimeral bristles; tibia of hind leg distinctly shorter than that of fore leg.	*flavus*, p. 321.
	Abdominal tergites marked otherwise; postnotum bare; no lower mesepimeral bristles; tibia of hind leg as long as, or longer than, that of fore leg	3.
3.	Tergites with median basal yellow markings.	*magnus*, p. 324.
	Tergites otherwise marked..............	4.
4.	Tergite II only with median basal white patch; ♀ with simple claws and distinct white ring on palpi just before middle ...	*annulipalpis*, p. 327.
	No median basal pale mark on tergite II; ♀ with toothed claws (as usual) and without a distinct white ring on palpi	5.
5.	Tergites IV–VII or V–VII with lateral yellow spots, as well as oblique white lateral marks	*annulitarsis*, p. 325.
	Tergites without lateral yellow markings...	*inchoatus*, p. 328.
6.	Tergites II–VII with lateral white markings, curving on to dorsum, where they become yellowish and form complete apical bands.	*longipalpis*, p. 329.
	Tergites with lateral white markings, not produced on to dorsum to form bands...	7.
7.	Tergites with some lateral yellow or creamy markings; style of ♂ with 9–14 spines at apex	8.
	Tergites without lateral yellow or creamy markings (though with the usual white lateral spots); style of ♂ with only 5 spines at apex	*digitatus*, p. 330.
8.	Tergites VI and VII only with distinct lateral yellow patches; style of ♂ with about 15 stout tooth-like spines at apex..	*omissus*, p. 330.
	Tergites IV–VI with indistinct lateral creamy or yellowish markings; style of ♂ with 9 finger-like spines at apex	*dentatus*, p. 331.

186. Armigeres (Leicesteria) flavus (Leicester), 1908.

Cul. Malaya, p. 101 (*Chætomyia*) (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: 3 ♀♀ co-types in Brit. Mus.

Leicesteria apicalis Theobald, 1908, Rec. Ind. Mus. ii, p. 291 (♂ & ♀). TYPE-LOC.: Lushai Hills, Assam (*E. L. Macleod*). TYPE: ♂ & ♀ in Ind. Mus.

Brevirhynchus apicalis Theobald, 1910, Rec. Ind. Mus. iv, p. 7 (♀). TYPE-LOC.: Sylhet, Assam (*Major Hall*). TYPE: ♂ in Ind. Mus.

ADULT *.—Medium-sized to large species (wing 3–5 mm.), distinguished from all others of the genus occurring in India by the short hind tibia.

♀.—*Head*: with scales on vertex mostly creamy-yellow, with three patches of black scales in front near eye-margins, these patches sometimes joined. Palpi and proboscis all black scaled, palpi ⅜ to nearly ½ as long as proboscis. Clypeus without scales, dark brown, contrasting with orange-yellow tori. *Thorax*: not compressed and not distinctly produced over head, mesonotal scales mixed dark brown and golden-brown, with a rather broad border of creamy-yellow round

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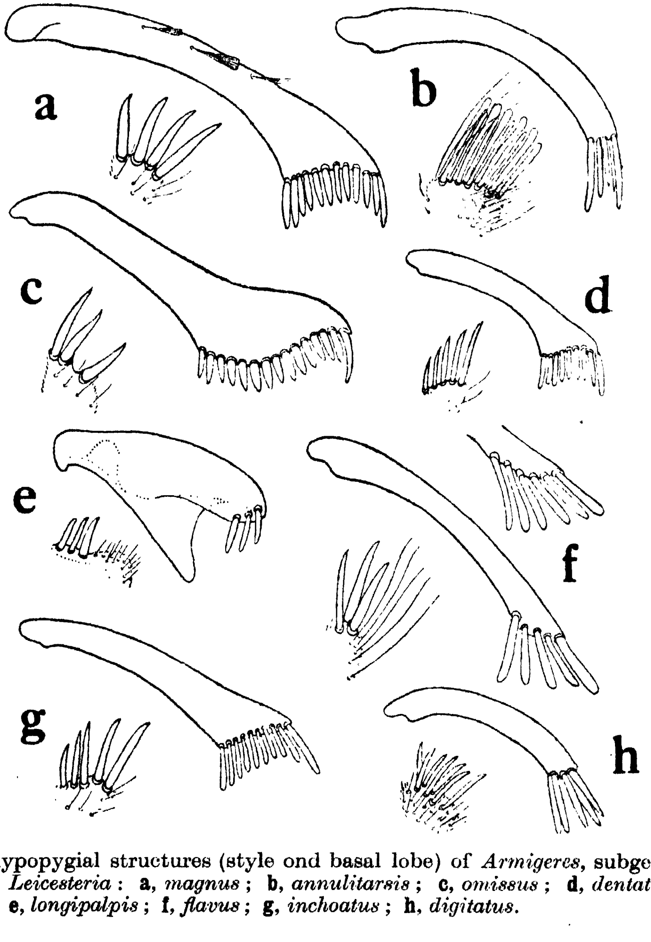
* Edwards 1914, p. 258 (syn.); Strickland 1917; Barraud 1927, p. 541.

Fig. 78.



♂ hypopygial structures (style ond basal lobe) of *Armigeres*, subgenus *Leicesteria*: **a**, *magnus*; **b**, *annulitarsis*; **c**, *omissus*; **d**, *dentatus*; **e**, *longipalpis*; **f**, *flavus*; **g**, *inchoatus*; **h**, *digitatus*.

front; *apn* and *ppn* with blackish flat scales above, creamy-yellow scales below. A few short and inconspicuous pale hairs at tip of postnotum; one strong lower mesepimeral bristle present. *Wings*: dark scaled. *Legs*: dark brown; pale area on outer side of hind femur not quite reaching tip;

front and middle tarsi with faint pale rings; hind tarsi with more distinct, though narrow, pale rings over joints 1–2 and 2–3 and sometimes at base of 4 and 5. *Abdomen*: dark brown above; tergites II–VI with narrow yellow apical bands, II–VII with large creamy lateral basal patches which tend to curve upwards beyond middle of each tergite but are not connected with the yellow bands and are scarcely visible dorsally.

♂.—Palpi with narrow yellowish rings at middle of long segment and at bases of last two segments; longer than proboscis by about length of last two segments. Ornamentation as in ♀. *Hypopygium* (fig. 78, f): *bl* with 3 strong spines placed close together and some long hairs. Style with 5 or 6 blunt spines at apex. *Lobes* of 9*t* more densely hairy than in other species. No definite scale-patch on coxite.

LARVA (fig. 76, e–g).—This has been described by Edwards and Given (1928, p. 342) as quoted below. Two skins from isolated larvæ obtained from bamboos at Nongpoh, Assam, vii. 1922 (*Barraud*), agree with this description. The larva, as well as the adult, possesses some unique characters. "*Head* much as in the other species of the genus; roundish in shape and pale in colour. Clypeal spines hair-like but set on large tubercles. Dorsal hairs placed far forward; *d* placed nearest the front, dendriform, with about 8 branches, ; *B* simple or 2-branched; *C* placed obliquely behind *B*, 3–4-branched, both rather small. Antennæ nearly cylindrical, smooth, with a fine hair at one-third of their length. Mentum rather broad, with about five teeth on each side of the triple median tooth. *Thorax* with not more than two simple hairs in any of the lateral tufts, which are set in distinct chitinous plates that have no trace of a projecting spine. *Abdomen* with all the hairs of segments 1–7 simple except the two lateral hairs of the first segment and the dorsal hair of the seventh, which are double; the dorsal hairs are almost as long and thick as the lateral hairs. Eighth segment with one strong lateral tuft composed of 5–8 stout simple branches and set in a small plate; other four hairs of eighth segment small, each with several branches. *Comb* of about 10 small scales in a patch; each scale has a pear-shaped base, the free portion being divided to the base into 3–5 portions, each of which is irregularly frayed towards the tip. *Anal segment* with two chitinous plates, one dorsal and the other ventral, the dorsal plate larger than the ventral and extending below the middle, not quite meeting the ventral plate. Outer dorsal hairs are 2- or 3-branched, inner 3–5-branched, both slightly plumose. Brush composed of five pairs of double (rarely triple), slightly plumose hairs, the usual chitinous transverse bars hardly indicated. A very small branched lateral hair set between the plates. Gills very stout, round-ended, over twice as long as the saddle. *Siphon* moderately dark, tapering, index about 1·0 ; without pecten, but with a small two-haired tuft at four-fifths of its length. No acus. Tracheæ very large, with numerous perforations near base of siphon.

" A unique feature of this larva, found in no other mosquito larva hitherto known, is the presence of a ventral chitinous plate on the anal segment. The comb-teeth are of unusual form, but the remaining characters are similar to those of other *Armigeres* larvæ."

HABITAT.—Bamboos and coconut-shells ; pitcher-plants (Singapore).

DISTRIBUTION.—Fairly common in forested areas of ASSAM, BURMA, BENGAL, and EASTERN HIMALAYAS up to 5,000′ or more; in the WESTERN GHATS from the Konkan to Malabar and MADRAS.

Known also from MALAY PENINSULA, SIAM, COCHIN CHINA, SUMATRA, JAVA, and BORNEO.

187. **Armigeres (Leicesteria) magnus** (Theobald), 1908.

Rec. Ind. Mus. ii, p. 293 (*Brevirhynchus*) (♂ & ♀). TYPE-LOC. : Sylhet, Assam, v. 1905 (*Hall*). TYPE : ♂ & ♀ in Ind. Mus.

Leicesteria annulitarsis (♂ only) Leicester, 1908, Cul. Malaya, p. 99. TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♂ in Brit. Mus.

Toxorhynchites rectirostris (Giles MSS.) Theobald, 1910, M.C. v, p. 214. TYPE-LOC. : Philippine Is. TYPE : in Brit. Mus.

ADULT *.—Distinguished by basally-banded abdominal tergites. Rather large species. Wing 4·5–5 mm.

♀.—*Head* : mainly covered with broad, flat, yellowish and dark brown scales, the latter forming a pair of sublateral and a pair of lateral patches. Tori with pale scales on inner sides. Palpi from $\frac{5}{8}$–$\frac{3}{4}$ length of proboscis, scaling of palpi light brown, except towards base ; proboscis dark brown. *Thorax* : mesonotum covered with light brown narrow scales, a pale border all round margin. Scutellar scales flat and dark brown. Flat white or creamy scales covering *apn*, lower part of *ppn*, and larger part of pleuræ ; a small patch of black scales behind anterior spiracle ; pale brownish flat scales on upper anterior part of *ppn*. *Wings* : scales brown, those towards base of costa and near base of vein 1 light when viewed from certain angles. *Legs* : mainly dark brown when seen from the front, almost entirely pale when

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* Theobald 1910 *b*, p. 145 ; Edwards 1914 *a*, p. 259 (syn.) ; Dyar & Shannon 1925, p. 74 ; Barraud 1927 *b*, p. 542.

seen from behind ; hind femur creamy or white except along dorsal edge ; pale scaling at tips of femora and tibiæ and at bases of tarsal segments, more distinct in some specimens than in others. *Abdomen* : tergites dark brown, with median basal yellow markings on II–V ; wider dull yellow basal markings on VI and VII ; wide lateral white markings from base of each tergite nearly to apex, the tips of these patches usually visible dorsally ; lateral basal yellow markings on III–VII or IV–VII, those on VI and VII usually joined to the dorsal yellow markings, forming complete bands. Sternites white, with narrow apical black bands on III–VI.

♂.—Palpi longer than proboscis by length of apical segment, dark brown, with fairly distinct yellowish rings at bases of last two segments, and a wider pale area nearer base. Markings very similar to those of ♀. *Hypopygium* (fig. 78, **a**) : *bl* with 4 strong spines all about same length. Style expanded at tip, with a row of 12 finger-like spines and a few scales at about middle.

[LARVA.—Four isolated skins sent by Dr. R. B. Jackson in 1933 from Hong Kong rather closely resemble *A. flavus*, having the same peculiar forms of comb-teeth, but differing in the following points :—Mentum more triangular ; one of the metathoracic tufts usually triple, as is the dorsal tuft on VII ; mid-lateral tuft on VIII with only 2, or at most 3, branches ; comb-scales fewer, about 6 in number ; ventral plate of VIII very small and inconspicuous, perhaps sometimes absent.

HABITAT (of Hong Kong specimens).—Pitcher-plants.]

DISTRIBUTION.—Similar to that given for *A. flavus*, except that it does not appear to have been recorded from Siam.

188. **Armigeres (Leicesteria) annulitarsis** Leicester, 1908.

Cul. Malaya, p. 99 (♂ only). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♀ in Brit. Mus.

ADULT *.—Distinguished by compressed thorax, yellow lateral markings on abdomen, and ringed tarsi. Wing about 4 mm.

♀.—*Head* : somewhat elongate ; mainly covered with flat black scales, a line or stripe of white scales from nape to vertex in middle, a narrow pale border to eyes, and a large patch of white scales low down at each side. Tori brown, with pale scales on inner sides. Clypeus very dark, with some pale scales each side. Palpi and proboscis brownish-black, the former white-tipped and about ½ length of proboscis. *Thorax* :

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* Edwards 1914 *a*, 260 ; 1923, p. 3 ; Barraud 1927 *b*, p. 543.

mesonotum distinctly produced over head, narrow and laterally compressed; dorsum covered with brown scales; a fairly wide pale border all round margin. Scutellar scales flat, dark and light brown mixed. Broad white scales covering larger part of *apn* and pleuræ, those on *ppn* dark brown; a patch of very dark scales behind anterior spiracle. *Wings*: dark scaled. *Legs*: brownish-black; femora extensively pale beneath; a few pale scales at tips of femora and tibiæ, and narrow pale rings at bases of first two, three, or four tarsal segments. *Abdomen*: tergites black, with lateral oblique white markings, tips of which are just visible dorsally; lateral basal yellow patches also on tergites IV–VII or V–VII.

♂.—Palpi a little longer than proboscis and marked with 3 pale rings. Other markings very similar to those of ♀. *Hypopygium*: *bl* with about 7–10 long, slightly clubbed processes, a few long hairs, and a dense patch of shorter hairs. Style with 5 spines at tip, the outer ones longer than inner. No scale-patch on coxite.

LARVA.—Very similar to those of other species of the genus. *Antenna* about 0·26–0·27 mm. long and about 6 times length of greatest width. Hair-tuft represented by a single rather long fine hair at about ¼ length of shaft from base. Preclypeal spines long, with hair-like terminal part as usual. *Frontal hair A* 3–4-branched, *B*, *C*, and *d* standing far forward; *d* slightly internal and anterior to *B*, fairly large, with a number of fine branches originating some little distance from a stout base; *B* single, stout, and long; *C* standing almost directly behind *B*, with about 6 fine branches. Lateral *thoracic hairs* 1–3-branched (one specimen with several hairs 4–5-branched), arising from small tubercles without spines. Number of branches in dorso-lateral hairs of first five *abdominal* segments are, respectively, 3, 3, 1, 1, 1, the single hairs sometimes divided into two. A second fairly large hair, slightly ventral to dorso-lateral series, on I and II, either single or 2-branched. A very long hair with 2 stout branches (in one specimen 3-branched) on VIII dorsal to comb; subsiphonal hair rather large and 4–5-branched, but much shorter than dorsal hair. Comb of about 20–25 teeth, very similar in form to those of *A. flavus*, but variable in shape; base large, usually longer than the terminal fringe. Siphon short and wide, about 1½–1¾ length of diameter at base, diameter at tip less than ½ that at base. Siphonal hair at about ¾ from base, either single or split distally into two. *Anal segment* with small chitinous saddle, its posterior margin smooth. Subdorsal hairs set in a single small dark plate; *osc* with 2–3, *isc* with 6–8, strong subplumose branches, subequal in length; *lh* at about middle of segment, towards posterior margin, some distance below border of saddle, very small, as usual, with several fine branches. About 6 pairs of fan-hairs, each with 5–6 branches. No fan-plate, and no trace of ventral plate adjoining fan. Papillæ very long.

HABITAT.—Bamboo-stumps (*Barraud*, Bombay Deccan); living bamboos bored by a beetle (*Hacker*, Malaya).

DISTRIBUTION.—ASSAM: Shillong *; Nongpoh *, Khasi Hills dist.; and Haflong *, Cachar Hills, vi.–viii. 1922 (*Barraud*). BOMBAY DECCAN: Nagargali *, Belgaum dist., viii. 1921 (*Barraud*). NORTH KANARA: Karwar * and Yellapur *, ix. & x. 1921 (*Barraud*). NILGIRI HILLS *, x. 1915 (*Khazan Chand*).

Recorded also from MALAY PENINSULA, SIAM, COCHIN CHINA, SUMATRA, and FORMOSA.

189. **Armigeres (Leicesteria) annulipalpis** (Theobald), 1910.

Rec. Ind. Mus. iv, p. 6 (*Brevirhynchus*) (♀). TYPE-LOC.: Madathoray, S.W. base of Western Ghats, Travancore, ix. 1908 (*Annandale*). TYPE: ♀ in Ind. Mus.

ADULT †.—Resembles *A.* (*L.*) *annulitarsis*, but easily distinguished by the ringed palpi and simple claws of ♀.

♀.—Palpi slightly more than ½ length of proboscis, with a conspicuous white ring at about middle, and some pale scales on upper surface near base. Clypeus dark brown, with some pale scales. Hind femur with a rather wide subapical dark ring all round leg; tibiæ with nearly complete basal pale rings; basal white rings on first two segments of fore and mid-tarsi; similar, but more pronounced, white rings on all hind tarsal segments. In addition to markings on abdomen noted in key, there are on tergites III–VI white scales forming a short curved line towards venter, so that, on these segments, the straight white lateral markings divide near hind margin, one part curving on to dorsum and the other towards the venter. Usually lateral yellowish patches on tergites III–VII or IV–VII, and scattered yellow scaling on dorsum of last few segments. A median white line and subapical white bands on sternites.

♂ and LARVA.—Unknown.

DISTRIBUTION.—SOUTH INDIA: Travancore *, type-locality, as given above; Malabar Coast, Tamarchery *, x. 1915 (*Khazan Chand*). BURMA: Papun *, near Moulmein, x. 1926 (3 ♀♀ in M.S.I. coll.)

Recorded also from SUMATRA.

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† Edwards 1921 *b*, p. 74; Barraud 1927 *b*, p. 544.

190. **Armigeres (Leicesteria) inchoatus** Barraud, 1927.

Ind. Journ. Med. Res. xiv, p. 544 (♂ & ♀). TYPE-LOC. : Tindharia, Darjeeling dist., x. 1922 (*Barraud*) (♂) ; Kurseong, Darjeeling dist., ix. 1922 (*Barraud*) (♀). TYPE : ♂ and allotype ♀ in Brit. Mus.

ADULT.—Resembles *A.* (*L.*) *annulitarsis*, but without yellow marks on abdomen. Wing 4–4·5 mm.

♀.—*Head* : scaling similar to *A. annulitarsis*. Clypeus dark brown, without scales. Palpi a little more than ½ length of proboscis, brownish-black, with a narrow pale ring much nearer base than apex. Proboscis dark brown. *Thorax* : mesonotum moderately produced over the head. A narrow border of pale scales, which are broad from wing-root to *ppn*, narrow round front margin ; dorsum covered with dark brown narrow scales, some lighter ones on either side of antescutellar space in some specimens. Scutellar scales dark and pale brown mixed. Postnotum dark brown ; *apn*, pleuræ, and coxæ mainly covered with broad white flat scales ; darker scales in middle of *ppn* and behind anterior spiracle, as usual. *Wings* : dark scaled. *Legs* : dark brown, with pale markings. Fore and mid-femora and tibiæ dark brown anteriorly, almost entirely pale posteriorly ; hind femur more extensively pale, but dark along dorsal edge and on outer side at knee. Tibiæ with a few pale scales at tips. Narrow basal pale markings on first two or three segments of fore and mid-tarsi, and on first four segments of hind tarsi. *Abdomen* : tergites II–VII with oblique white lateral markings, from base to about middle of each segment, produced on to dorsum, but not forming transverse bands. No lateral yellow patches. Venter white at base, following sternites with white patches and apical black bands.

♂.—Palpi a little longer than proboscis ; dark brown, with three narrow white rings. Scutellar scales rather lighter than in ♀. *Hypopygium* (fig. 78, g) : *bl* with 5 strong, pointed spines. Style expanded apically, with a row of 10 finger-like, rather blunt spines, the outermost longer than others. No scale-patch on coxite.

LARVA.—Unknown.

HABITAT.—Bamboos.

DISTRIBUTION.—Known only from type-localities.

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perhaps, also of *cingulatus*) are variable, at least in the ♂ sex. In the type ♀ of *longipalpis* the abdomen is unbanded, but there is no certainty that this is correctly associated with the type ♂ ; it may belong to one of the allied species which Leicester had undoubtedly included under *longipalpis*. There appear to be no adequate grounds for upsetting Edwards's restriction of *longipalpis*. This name is, therefore, used for the species called *cingulatus* by Barraud ; the true *cingulatus* (as figured by Edwards) has not yet been found in the Indian region.]

191. Armigeres (Leicesteria) longipalpis (Leicester), 1904*†.

In Theobald, Entom. xxxvi, p. 211 (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Usually distinguished by complete apical bands on abdominal tergites and dark tarsi. Wing about 4 mm.

♀.—*Head*: scales mainly black, but a narrow pale border to eyes, and a white patch low down at each side. Tori and first flagellar segment of antennæ with some pale scales. Clypeus, palpi, and proboscis brownish-black, the first with some narrow pale scales each side directed outwardly. Proboscis with a more or less evident pale line beneath, as in several other species. Palpi entirely dark, about ½ length of proboscis. *Thorax*: rather narrow, and produced over the head. Scales dark brown, with a narrow pale margin all round. *Wings*: dark scaled. *Legs*: hind femur white except dorsally; tibiæ and tarsi entirely dark, but paler when seen from behind, as in several other species. *Abdomen*: tergites brownish-black, II–VII with oblique white patches, running from base to near hind margin of each segment, continued on to the dorsum, where they become yellowish and form complete bands; on II–V these bands are usually very slightly subapical; on VI and VII they are usually apical. [In some specimens the bands may be incomplete dorsally on VI and VII or even on all segments.] No lateral yellow patches.

♂.—Palpi a little longer than proboscis, entirely dark. Markings as in ♀. *Hypopygium* (fig. 78, e): *bl* with 3 very short stout spines. Dorsal border of coxite with a thick patch of scales along basal ½. Style characteristic; comparatively short and wide; divided apically into two parts, one of which carries 3 fairly short spines.

LARVA.—Unknown.

HABITAT.—Bamboos.

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* Edwards 1914 *a*, p. 260; Barraud 1927 *b*, p. 545 (*cingulatus*).

† [It was suggested by Barraud (1927 *b*, p. 546) that Edwards (1914 *a*, pp. 260 and 261) made a mistake in figuring the hypopygium of *A.* (*L.*) *longipalpis* and *cingulatus*, transposing the two figures. The reason for this suggestion was that Indian specimens with the hypopygium as figured by Edwards for *longipalpis* agreed with Leicester's description of *cingulatus*, and differed from that of *longipalpis* in the markings of the abdomen. But against this it must be stated that (1) the hypopygia of the two types were carefully labelled at the time of figuring, and it is unlikely that they were mixed in mounting; (2) the two ♂ types as now standing in the British Museum collection show no appreciable difference in ornamentation, *both* having complete apical bands on tergites II–V, incomplete bands on VI and VII; and (3) that there is a ♂ in the British Museum from Sarawak in which the hypopygium has the structure figured by Edwards for *longipalpis*, but the white abdominal markings do not form complete bands dorsally on *any* segment. It seems clear, therefore, that the abdominal markings of *longipalpis* (and,

[Footnote continued on previous page.

DISTRIBUTION.—ASSAM : Nongpoh *, Khasi Hills dist., and Haflong *, Cachar Hills, vii. & viii. 1922 (*Barraud*). EASTERN HIMALAYAS : Tindharia * and Kurseong *, both Darjeling dist., ix. & x. 1922 (*Barraud*).

Known from MALAY PENINSULA, and recorded from SUMATRA and BORNEO.

192. **Armigeres (Leicesteria) digitatus** Edwards, 1914.

Bull. Ent. Res. iv, p. 262 (♂ & ♀). TYPE-LOC. : Ulu Gombak, F.M.S. viii. & ix. 1903 (*Daniels*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT ♀. †—A comparatively small species resembling *A. inchoatus* in general appearance, but distinguished by absence of pale rings on tarsi, the leg-markings being similar to those of *A. cingulatus*. Palpi and proboscis entirely dark brown, former nearly ⅜ length of proboscis. Mesonotum distinctly produced over the head. Abdomen without any lateral yellow patches, but with oblique white lateral markings not produced on to upper side, the tips being only just visible dorsally in some specimens.

♂.—Markings as in ♀. Palpi a little longer than proboscis, entirely dark brown. *Hypopygium* (fig. 78, **h**) : *bl* with about 7 sharp spines, arranged more or less in two rows. Style rather short, not widened at tip, with 5 blunt spines at tip, somewhat resembling the spread-out fingers of a hand. No scale-patch on coxite.

LARVA.—Unknown.

HABITAT.—Bamboos.

DISTRIBUTION.—NORTH KANARA : Yellapur *, x. 1921 (*Barraud*). NORTH BENGAL (Darjeeling dist.) : Sukna * and Tindharia *, ix. & x. 1922 (*Barraud*) ; Pashok, 3,500′ (*Graveley*).

Recorded also from PHILIPPINE IS. and SUMATRA.

193. **Armigeres (Leicesteria) omissus** Edwards, 1914.

Bull. Ent. Res. v, p. 76 (♂ & ♀). TYPE-LOC. : Ceylon, Colombo (*James*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT ‡.—Resembles *A. digitatus* in having entirely dark tarsi, but differs from that species in having lateral yellow spots on last two abdominal tergites, and from *A. cingulatus* in the absence of pale bands on dorsum of abdomen.

Palpi and proboscis entirely dark in both sexes ; palpi of ♀ nearly ⅜ length of proboscis, those of ♂ longer than proboscis by ½ length of apical segment. Clypeus bare.

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† Barraud 1927 *b*, p. 546.

‡ Barraud 1927 *b*, p. 547.

Legs: black scaled; undersides of fore and mid-femora white; hind femora white, except dorsally and near tip. Fore tibiæ shorter than mid- or hind pair. Segment 1 of hind tarsi about same length as tibia. *Abdomen*: black scaled dorsally; segment I with a broad white patch on each side; II–VII with large lateral oblique white patches, upper margin of each concave, extending nearly to hind margin of each tergite, and not produced on to dorsum, tips only visible from above in some specimens. Small basal lateral yellow patches on VI and VII only.

♂.—*Hypopygium* (fig. 78, **c**): *bl* with 3 strong sharp spines. Style much expanded apically, with a row of strong spines, one fairly long and about 14 short and stout. Dorsal border of coxite with a patch of scales near base.

LARVA.—[Very similar to *annulitarsis*, differing chiefly as follows:—Dorso-lateral hair on VIII shorter and much less conspicuous. Comb-teeth sometimes fewer (12–25), and rather different in average form, with smaller base and longer, more spiny fringe. Siphon shorter, diameter at tip $\frac{2}{3}$ that at base; tuft only slightly beyond middle of tube; *isc* with fewer branches (4–5).]

HABITAT.—Bamboo-stumps.

DISTRIBUTION.—CEYLON: Colombo, type-locality, as given above; Peradeniya (*Green*). BOMBAY DECCAN: Nagargali *, Belgaum dist., viii. 1921 (*Barraud*).

Not known from elsewhere.

194. **Armigeres (Leicesteria) dentatus** Barraud, 1927.

Ind. Journ. Med. Res. xiv, p. 547 (♂). TYPE-LOC.: Nongpoh, Khasi Hills dist., Assam, xi. 1921 (*Christophers*). TYPE: ♂ in Brit. Mus.

ADULT.—Very similar to *A.* (*L.*) *inchoatus*, but with dark tarsi. Wing (♂) about 3·5 mm.

♂.—*Head*: mainly black scaled; a pale patch in middle of vertex and narrow pale border to eyes; a band of pale scales low down each side; a small collection of pale upright scales on nape. Tori brown, with small broad pale scales on inner sides and on first flagellar segment of antenna. Clypeus black, bare. Palpi and proboscis brownish-black, former a little longer than latter; proboscis with a narrow pale streak on underside for nearly whole length. *Thorax*: mesonotum only slightly produced over the head, covered with narrow dark brown scales; a narrow pale border round front margin from wing-roots. A mixture of flat dark brown and paler scales on scutellum. Scaling of pleuræ as in *A. inchoatus*. *Wings*: dark scaled. *Legs*: dark brown, paler posteriorly; hind femur pale ventrally on outer side to knee; no pale knee-spots dorsally on femora; tibiæ and tarsi entirely dark. *Abdomen*: black dorsally; lateral oblique white markings from base of each tergite, not produced on to dorsum, and not reaching hind margins of segments, the tips just visible dorsally; IV–VI with indefinite and indistinct basal lateral yellowish patches. Sternites with basal pale bands and apical dark bands. *Hypopygium* (fig. 78, **d**): very similar to that of *A. inchoatus*.

LARVA and ♀.—Unknown.

DISTRIBUTION.—Known only from type-locality.

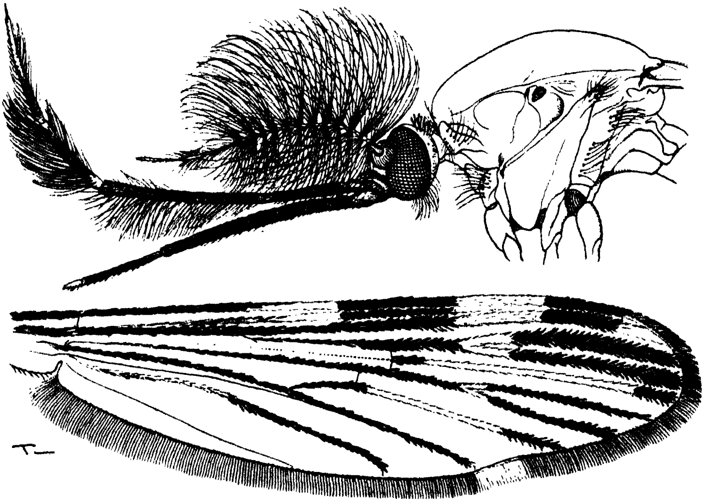
Genus **CULEX** Linnæus, 1758.

Syst. Nat. ed. 10, p. 602.

(For synonymy see under subgenera).

ADULT.—Distinguished from all other genera by the presence of well-developed pulvilli (these are best seen under a binocular microscope against a dark background, when they appear pale). Bucco-pharyngeal armature present in ♀♀ (absent in all other genera). No spiracular or postspiracular bristles. Mesonotal bristles well developed. Mesonotal and scutellar scales usually all narrow. Other characters given under

Fig. 79.

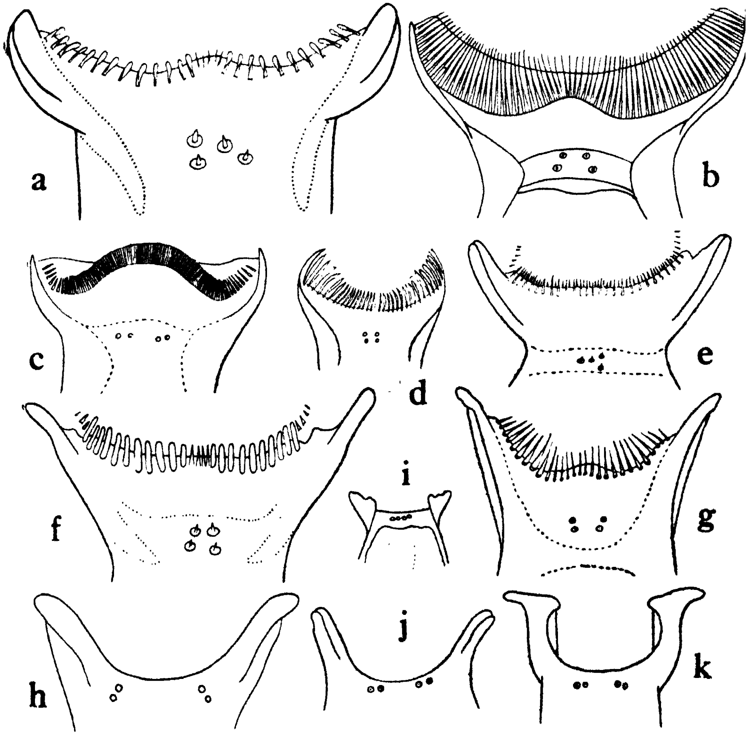


Upper figure: side view of *Culex* (*Lutzia*) *fuscanus*, showing typical form of palpi in genus *Culex*, also lower mesepimeral hairs of subgenus *Lutzia* (hairs on mesonotum, *ppn*, and sternopleura omitted). Lower figure: wing of *Culex mimeticus*, showing markings; venation and scaling typical of *Culex*.

subgenera. No very well-marked subgeneric characters have been discovered by which the ♀♀ may be separated, but ♂♂ can be distinguished on characters of the palpi, antennæ, or hypopygium.

Pupa.—Respiratory trumpet usually of moderate length and with rather small opening. Well-developed dendritic tufts on abdominal segment I. Paddles usually wide and rounded, with 2 short hairs at or near termination of midrib; posterior margin without fringe or serrations.

Fig. 80.



a–g, pharyngeal teeth of different species of *Culex*: **a**, *C.* (*Lutzia*) *vorax*; **b**, *C.* (*Mochthogenes*) *malayi*; **c**, *C.* (*Neoculex*) *tenuipalpis*; **d**, *C.* (*Lophoceratomyia*) *uniformis*; **e**, *C.* (*Culiciomyia*) *viridiventer*; **f**, *C.* (*Culex*) *bitæniorhynchus*; **g**, *C.* (*Culex*) *fuscocephalus*. **h–k**, pharyngeal bar of other genera, showing absence of teeth: **h**, *Megarhinus*; **i**, *Uranotænia*; **j**, *Armigeres*; **k**, *Aëdomyia*. (Posterior hard palate not shown in any case).

Larva.—In the subgenus *Lutzia* the mouth-parts are modified for predacity, the mouth-brushes being composed of strong curved and fringed lamellæ; frontal hairs usually single; antennal tuft represented by a single short hair;

siphon very short, with pecten extending for nearly the whole length. In the other subgenera the mouth-parts are normal; one or more pairs of frontal hairs with several branches; antennal tuft usually well developed and beyond middle of shaft; siphon of very variable length, with pecten extending along at most basal ½ of tube. The larvæ differ from those of most other genera in having several pairs, or a posterior row, of branched hairs on the siphon. Abdomen without chitinous plates; comb of segment VIII variable in form, but usually composed of a number of scale-like teeth in a triangular patch. Except in the case of *Lutzia* there are no very well-marked subgeneric characteristics.

EGG.—So far as is known the eggs are laid in rafts, a number of eggs being cemented together in a boat-shaped mass, which floats on water. The individual eggs are narrowed at one end, and the larva emerges by bursting off a cap at the lower (larger) end, which is in contact with the water-surface.

Notes on bionomics are given under subgenera.

Key to Subgenera.

♀♀.

1.	Four or more lower mesepimeral bristles .	LUTZIA, p. 338.
	One or two lower mesepimeral bristles, or none	2.
2.	Proboscis with a pale ring in the middle..	CULEX (part), p. 387.
	Proboscis without a pale ring	3.
3.	First hind tarsal segment distinctly shorter than tibia.........................	BARRAUDIUS, p. 345.
	First hind tarsal segment about as long as tibia or longer	4.
4.	Dorsal surface of head mainly covered with flat scales	*C.* (*Mochthogenes*) *malayi*, p. 358.
	Dorsal surface of head mainly covered with narrow scales; flat scales, if present, confined to sides or eye-margins.	5.
5.	Rather large to medium-sized species, without any broad scales adjacent to eyes............................	CULEX (part), p. 387.
	Smaller, usually dark-coloured species, or else with small broad scales on vertex around eye-margins	6.
6.	Wing-scales scanty, especially on vein 6..	LOPHOCERATOMYIA, p. 359.
	Wing-scales denser	7.
7.	Vertex with small broad scales forming a border to eyes	8.
	Vertex without any broad scales along eye-margins	9.
8.	Moderate-sized species	CULICIOMYIA, p. 376.
	Very small species	*C.* (*Mochthogenes*) *pluvialis*, p. 356.
9.	No lower mesepimeral bristles..........	*C.* (*Neoculex*) *brevipalpis*, p. 348.
	One or two lower mesepimeral bristles ...	10.
10.	Dorsum of abdomen with very narrow basal pale bands	*C.* (*Neoculex*) *tenuipalpis*, p. 351.
	Dorsum of abdomen unbanded	MOCHTHOGENES (part), p. 352.

♂♂.

1. Four or more lower mesepimeral bristles..	LUTZIA, p. 338.
One or two lower mesepimeral bristles, or none	2.
2. Antenna with matted tuft, or tufts, of hairs, and sometimes scales, on one or more flagellar segments	LOPHOCERATOMYIA, [p. 359.
Antenna without such tufts	3.
3. Palpi longer than proboscis	4.
Palpi shorter than proboscis	6.
4. Palpi with a row of long scales projecting obliquely inwards and downwards from apical part of long segment	CULICIOMYIA, p. 376.
Palpi without such scales...............	4.
5. First hind tarsal segment shorter than tibia	BARRAUDIUS, p. 345.
First hind tarsal segment as long as, or longer than, tibia	CULEX, p. 387.
6. Palpi from ½–⅝ length of proboscis.......	NEOCULEX, p. 347.
Palpi not more than about ⅙ length of proboscis	MOCHTHOGENES, [p. 352.

Key to known Larvæ (4th stage) *.

1. Mouth-parts adapted for predacity; pecten extending along nearly whole length of siphon; frontal hairs *A*, *B*, *C* usually single, but may be split (fig. 82)................................	*C.* (*Lutzia*), all species, [pp. 342–344.
Mouth-parts normal; pecten confined to about basal ½ of siphon or less; one or more pairs of frontal hairs with several branches..........................	2.
2. Hair-tufts on siphon arranged in a close-set zigzag row along mid-posterior line, several hairs being between the pectens; no lateral hair-tufts	*C.* (*B.*) *modestus*, p. 347.
Hair-tufts on siphon usually arranged in pairs on either side of mid-posterior line, but, if some are more or less in a zig-zag row, none are between the pectens, or there are lateral tufts in addition.......	3.
3. Comb of 4–8 large sharp teeth...........	4.
Comb of more numerous smaller scale-like teeth arranged in a triangular patch....	7.
4. Mentum with very numerous minute teeth (fig. 91)	*C.* (*C.*) *bitæniorhynchus*, [p. 393.
Mentum with fewer teeth, some or all of which are of normal size	5.
5. Pecten of 2–4 small teeth close together at base of siphon; mentum with about 20 teeth either side of central one, the 12 teeth on either side nearest base very small; subapical bristles on antenna about mid-way between tuft and tip of shaft (fig. 91)	*C.* (*C.*) *cornutus*, p. 396; [*sinensis*, p. 395.

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* As the larvæ do not exhibit clearly-defined subgeneric characters, one key is given for all the known Indian larvæ of this genus. [At the suggestion of the author this key has been revised and largely re-written].

	Pecten of 8–14 teeth extending some distance from base of siphon; mentum with about 6 teeth on either side of central one, all about same size; subapical bristles on antenna much nearer to tip of shaft than to tuft	6.
6.	Anal papillæ as long as siphon, latter with 5–6 pairs of long 2-branched hairs, each about ½ length of siphon; pecten-teeth smaller than comb-teeth (fig. 96) ..	*C.* (*C.*) *whitmorei*, [p. 407.
	Anal papillæ about ½ length of siphon or less, latter with 6–7 pairs of rather short hairs with 3–5 branches, of which longest are about ⅙ length of siphon; larger pecten-teeth as large as comb-teeth (fig. 93)	*C.* (*C.*) *vishnui*, p. 402.
7.	Body-integument covered with a dense pile of small dark hairs; chitinous ring of anal segment with numerous stiff bristly spines on and near posterior margins..........................	*C.* (*L.*) *uniformis*, [p. 374.
	Body without such pile; chitinous ring of anal segment smooth, or with at most a few short spines	8.
8.	Preclypeal spines remarkably thick, black and rather blunt-tipped; anal papillæ very short and rounded, hardly longer than wide; siphonal index 2–2·5.......	*C.* (*C.*) *sitiens*, p. 399.
	Preclypeal spines not so thick, sharply pointed; anal papillæ at least 3 times as long as wide, usually longer than anal segment..........................	9.
9.	Preclypeal spines rather short, stout, black, and usually straight	10.
	Preclypeal spines long, slender, pale, and curved	26.
10.	Frontal hairs *B* and *C* not reaching front of head, with only 1–2 almost simple branches, *C* quite small and much shorter than *B*; pecten-teeth with small denticles extending the whole length of one side, those on outer ½ very fine; preapical bristles practically at tip of antenna	11.
	Frontal hairs *B* and *C* both reaching front of head or beyond, with distinctly plumose branches....................	13.
11.	Siphon fairly broad at base, very narrow at tip (hardly more than ¼ of basal diameter); siphonal tufts very long, longest about 4 times length of diameter of tube at point of attachment	*C.* (*N.*) *tenuipalpis*, [p. 352.
	Siphon about ½ as broad at tip as at base, and more evenly tapering; longest tuft hardly more than twice length of diameter of tube	12.
12.	Comb-teeth fringed to tip	*C.* (*M.*) *castrensis*, [p. 356.
	Comb-teeth fringed at base only, ending in a long point	*C.* (*M.*) *malayi*, p. 359 *.

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* Position in key uncertain, as frontal hairs have not been described.

13. Siphon short (index 3–4), slightly swollen near middle .... *C.* (*C.*) *gelidus*, p. 408.
 Siphon longer (index at least 4·5, usually much more), not at all swollen near middle, but widest at base .... 14.

14. Siphonal index 4·5–5; distal pecten-teeth strong and usually curved; *isc* with 4 fairly long branches .... *C.* (*C.*) *theileri*, p. 415.
 Siphonal index at least 6; other characters not as above .... 15.

15. Siphon long, narrow, slightly tapering on basal ½, parallel-sided on apical ½, index 8 or more; frontal hairs *B* and *C* 2-branched .... 16.
 Siphon shorter and wider, somewhat tapering from base to apex, index usually about 6–7, rarely more; frontal hair *C* 3–5-branched...................... 22.

16. Siphon with minute hair-tufts, index 11–14; *isc* single .... *C.* (*N.*) *brevipalpis*, [p. 350.
 Siphon with moderate hair-tufts (about as long as diameter of tube); index 8–10·5; *isc* with 3–5 branches .... 17.

17. Siphon with a dark ring in middle ...... 18.
 Siphon without a dark ring in middle ... 19.

18. Siphon with a dark ring also at base .... *C.* (*L.*) *minutissimus*, [p. 364.
 Siphon without a dark ring at base ..... *C.* (*L.*) *fraudatrix*, [p. 369.

19. Lateral hairs of abdominal segments I and II unusually stout .... *C.* (*M.*) *khazani*, [p. 357.
 Lateral hairs of abdomen normal .... 20.

20. Pecten of 8–12 teeth .... *C.* (*L.*) *fraudatrix*, [p. 369.
 Pecten of about 16 teeth .... 21.

21. Anal papillæ more than twice length of segment; siphonal index 9–10 .... *C.* (*L.*) *minor*, p. 371.
 Anal papillæ not much longer than segment; siphonal index about 10·5 ...... *C.* (*L.*) *mammilifer*, [p. 375.

22. Siphonal tufts fully twice as long as diameter of tube, 8–10 in number (or 4–5 pairs), in addition to 2 pairs of short hairs near apex of tube; subapical bristles on antenna some distance from tip of shaft .... *C.* (*C.*) *mimeticus*, [p. 411.
 Siphonal tuft scarcely longer than diameter of tube; subapical bristles on antenna near tip of shaft .... 23.

23. Siphon with 6 or 7 pairs of hair-tufts..... 24.
 Siphon with 4 or 5 pairs of hair-tufts .... 25.

24. *lh* of 4 very short branches; anal papillæ about length of segment, ends bluntly pointed; pecten-teeth with 4–5 denticles; teeth of mentum regular .... *C.* (*C.*) *tritæniorhynchus*, [p. 405 (and [? *whitei*, p. 402).
 lh of 3 short branches; anal papillæ longer than segment, ends sharply pointed; pecten-teeth usually with 6 denticles ... *C.* (*C.*) *mimulus*, p. 412.

25. Siphon with one pair of tufts, lateral in position; teeth of mentum irregular in size; antennal tuft at ⅔; *isc* usually 3-branched........................ *C.* (*C.*) *barraudi*, p. 403.

Siphon with 2 pairs of tufts, lateral in position; antennal tuft at $\frac{2}{3}$; *isc* 2-branched .... *C.* (*C.*) *univittatus*, p. 420.

26. *isc* single .... 27.

isc of 2–3 fairly long branches .... 31.

27. Posterior margin of chitinous ring of anal segment with short spines; siphon normal, tapering .... 28.

Posterior margin of chitinous ring of anal segment smooth .... 30.

28. Antennæ moderate, tuft beyond middle; frontal hairs *B* and *C* 5–6-branched .... *C.* (*L.*) *cinctellus* ?, p. 366.

Antennæ long, tuft at or before middle; frontal hairs *B* and *C* 2–3-branched .... 29.

29. Siphon about 2·3 mm. long .... *C.* (*Culic.*) *viridiventer*, p. 379.

Siphon about 1·4 mm. long .... *C.* (*Culic.*) *shebbearei*, p. 380.

30. Siphon long and tapering, with a false joint beyond middle, due to lack of chitinisation in an irregular ring .... *C.* (*Culic.*) *nigropunctatus*, p. 384.

Siphon somewhat widened before middle, without false joint .... *C.* (*Culic.*) *pallidothorax*, p. 381.

31. Siphonal tufts of 4–6 branches, index about 4; *lh* single .... *C.* (*C.*) *fatigans*, p. 422.

Siphonal tufts of 2–5 branches, index 5–6·5; *lh* 2-branched .... 32.

32. Mentum with about 11 teeth on either side of central one; *isc* 2-branched .... *C.* (*C.*) *vagans*, p. 418.

Mentum with about 7 teeth on either side of central one; *isc* 3-branched .... *C.* (*C.*) *fuscocephalus*, p. 426.

Subgenus LUTZIA Theobald, 1903.

M.C. iii, p. 155. Genotype, *L. bigoti* Theo.

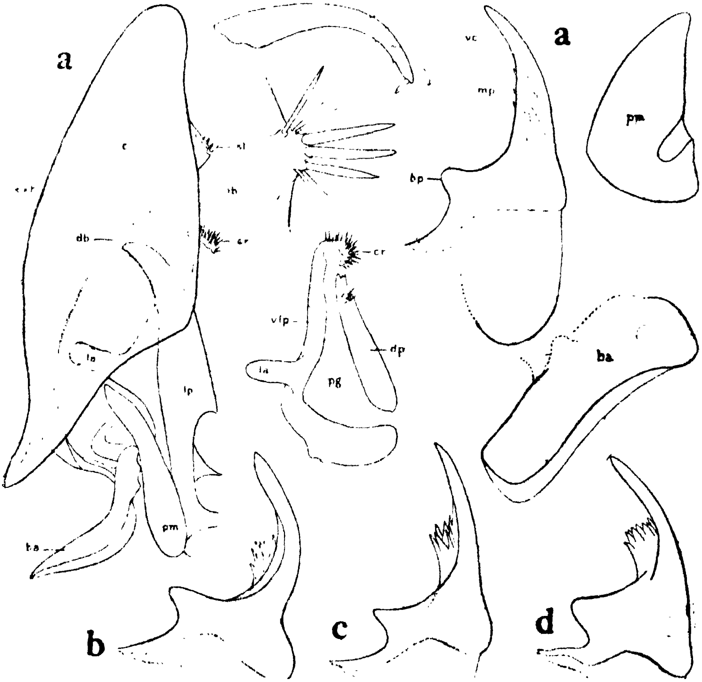
Jamesia Christophers, 1906, Sci. Mem. Med. Ind. p. 12. Genotype, *C. fuscanus* Wied. (as *C. concolor*).

Adult.—Large mosquitoes, distinguished from those in other subgenera of *Culex* by the presence of 4 or more lower mesepimeral bristles, and from all other genera by the presence of well-developed pulvilli. Palpi of ♂ longer than proboscis, last two segments upturned and hairy; of ♀ not more than ¼ length of proboscis. Wings with c.-vs. 2–3, 3–4, and 4–5 approximated and sometimes in straight line. Fore and mid-femora and tibiæ mottled with spots of pale scales. Coxite of ♂ hypopygium without scales, but with subapical lobe bearing 3–5 stout spines. Style rather short, simple, curved, with small terminal appendage. Phallosome divided into lateral plates, with long pointed apex (ventral cornu) and some close-set teeth below this. Paraprocts with numerous spines at crown, a few minute hairs just below, and a projecting ventro-lateral arm.

The bucco-pharyngeal armature of ♀ resembles that of some species of subgenus *Culex*, the teeth being comparatively short and blunt, and in some preparations the tips of the teeth appear to be thin and spoon-shaped (fig. 80, **a**).

LARVA.—Mouth-parts modified for predacity; mouth-brushes of a moderate number of strong curved rods, with minute hairs along one side on apical $\frac{1}{2}$. Frontal hairs single. Siphon short, with a postero-ventral row of hair-tufts and with pecten, both extending along whole length of tube. Anal segment large, longer dorsally than ventrally.

Fig. 81.



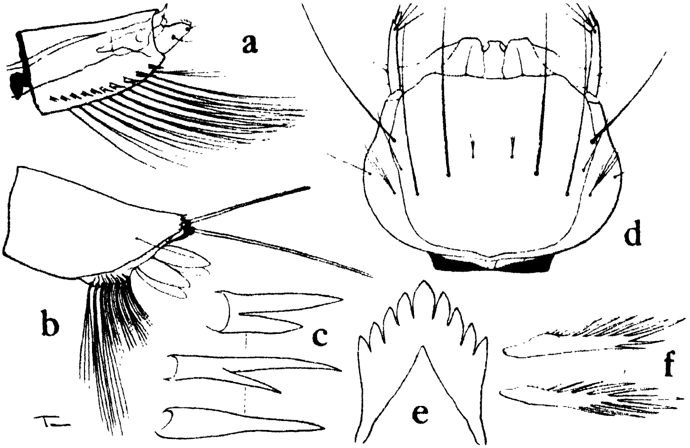
♂ hypopygial structures of *Culex*, subgenus *Lutzia*: **a** (seven upper figures), *fuscanus*; **b**, *raptor*; **c**, *vorax*; **d**, *halifaxi*. *exb*, *db*, and *ib*, external, dorsal, and internal border of coxite; *bp*, *mp*, and *vc*, basal process, median processes, and ventral cornu of lateral plate of phalosome; *vlp*, *dp*, ventro-lateral and dorsal plates of proctiger. Other lettering as on p. 4.

DISTRIBUTION and BIONOMICS.—All the four known Oriental species occur in India, three being fairly common, and one of these is found up to about 6,000′ in the hills. The larvæ live in open pools of various kinds, in shallow wells, and in domestic collections of water, where they are entirely predaceous and devour the larvæ of other mosquitoes, chiefly

Culex fatigans. The adult ♀♀ seldom attack man to any extent.

One other species occurs in Africa, and four others in Central and South America.

Fig. 82.



Larva of *Culex* (*Lutzia*) *halifaxi* : **a**, siphon ; **b**, anal segment ; **c**, pecten-teeth, showing variation ; **d**, head ; **e**, mentum ; **f**, comb-teeth.

Key to Adults *.

1.	Anterior surface of hind femur pale scaled on basal ½ except dorsally, pale scaling on apical ½ forming a line to the tip	2.
	Anterior surface of hind femur with numerous dark scales on basal ½, apical ½ without a distinct line of pale scaling to the tip	3.
2.	Abdominal tergites all with whitish or ochreous apical bands, those on last few broader than those on anterior segments	*raptor*, p. 348.
	Abdominal tergites V–VIII entirely yellow scaled, or with broad apical bands ; II–IV entirely dark, or with very narrow apical bands	*fuscanus*, p. 341.
3.	Abdominal tergites all with pale apical bands of about the same width	*vorax*, p. 344.
	Abdominal tergites entirely dark, or with pale lateral markings only on the last few segments, or with very narrow pale apical bands	*halifaxi*, p. 344.

* All four Indian species are very similar in markings, and some specimens are difficult to identify with certainty. The larvæ appear to be indistinguishable. For these reasons it has been thought that they represent different forms of one species, but there are some differences in the form of the lateral plate of the phallosome of the ♂♂ which seem to be constant.

195. **Culex (Lutzia) fuscanus** Wiedemann, 1820*.

Dipt. Exot. i, p. 9 (♀) [?]. TYPE-LOC.: "Ind. or." TYPE: non-existent (formerly in Vienna Mus.).

Culex concolor Theobald, 1901, M.C. ii, p. 107 (? *C. concolor* Robineau-Desvoidy, 1825, Mem. Soc. Hist. Nat. Paris, iv, p. 405. TYPE-LOC.: unknown. TYPE: non-existent).

Culex setulosus Doleschall, 1857, Nat. Tijd. Ned.-Ind. xiv, p. 384 (♀). TYPE-LOC.: Java. TYPE: non-existent (formerly in Vienna Mus.).

? *Culex luridus* id., ib. p. 384 (♀). TYPE-LOC.: Java. TYPE: ? non-existent.

ADULT †.—Wing about 5 mm.

♀.—*Head*: covered with narrow pale yellow scales and numerous upright scales, which appear dark from most angles; some broad white scales low down at each side. Antennæ brown; tori and first flagellar segment with a few small pale scales. Clypeus and palpi dark brown, latter speckled with numerous pale yellow scales. Proboscis with wide pale yellow area in middle on both upper and undersides, variable in extent, otherwise dark brown. Palpi about $\frac{1}{4}$ length of proboscis. *Thorax*: mesonotum covered with dark brown narrow scales, with lighter scales forming indefinite pattern of faint lines and spots; usually a pale spot each side at level of anterior spiracle, another pair of spots on dorsum in front of level of wing-roots, and a pair of faint lines from these to lateral lobes of scutellum; a faintly indicated median line anteriorly. Narrow, pale yellow, rather sparse scales on scutellum, *apn*, and posterior part of *ppn*; some darker scales on anterior part of *ppn*. Pleuræ with few scales; some broad pale scales on upper part of sternopleura and mesepimeron; another small collection on lower part of sternopleura opposite lower corner of mesepimeron. *Wings*: dark scaled; c.-vs. 2–3, 3–4, and 4–5 sometimes one below the other in straight line, but position of 4–5 variable, either slightly nearer base of wing or slightly nearer apex than other two. *Legs*: fore and mid-femora, when seen from the front, dark brown, plentifully sprinkled with pale scales; when seen from behind almost entirely pale yellow; hind femur on outer side pale on basal $\frac{1}{2}$ except dorsally, with pale scaling forming a more or less definite line to tip; on inner side almost entirely pale. Tibiæ extensively speckled with pale scaling; tarsi brown or pale yellow, according to angle of view. No definite pale rings. *Abdomen*: markings variable; tergites II–IV either entirely dark brown, or with narrow yellow apical bands, and with or without a pair of submedian yellow spots ; V with broad yellow apical band ; VI–VIII usually entirely yellow scaled.

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* The first part of Wiedemann's work was published in 1820, as recently shown by England (Ann. Mag. Nat. Hist. (10) viii, 1931, p. 613).

† Theobald 1901 *b*, p. 107 (*concolor*); Leicester 1908, p. 154 (*concolor*); Edwards 1922 *c*, p. 275 (syn.); Barraud 1924 *c*, p. 973; Brug 1924 *b*, p. 25.

♂.—Antennæ densely plumose. Palpi longer than proboscis by rather more than length of apical segment ; apical ½, or more, of palp with long hairs projecting laterally from each side ; hairs dark, except at tip of penultimate segment and along apical segment, where they are yellowish ; scaling brown except on apical segment, where it appears mainly yellow ; white scales on underside at joints between segments. Proboscis with pseudo-joint rather beyond middle, where there is a fairly narrow ill-defined pale ring ; otherwise scaling is dark brown. Other markings as in ♀. *Hypopygium* (fig. 81, **a**) : subapical lobe of coxite with usually a fourth spine, more or less developed, and separate from the other three : *lp* with about 4 rather long teeth on the side of the ventral cornu, differing from the toothed median process present in the other three species.

Larva *.—*Head* moderately large. Antenna short, shaft smooth, with a single short hair at about ⅓ from base ; other hairs and spines all near tip of shaft. Mouth-brushes of a moderate number of strong curved rods, each with minute hairs along one side on apical ½. *Frontal hairs A, B,* and *C* long and usually single, but may be split into two ; *A* some little distance posterior to base of antenna ; *B* and *C* placed far back, *C* being posterior to *e*, *B* about level with *e* ; *d* anterior and internal to *B*, small and with several fine branches ; *e* fairly long and usually single. Each individual pair of hairs widely spaced. Preclypeal spines inconspicuous, but fairly long, widely separated, and arising from small tubercles ; external to each is a small " anterior frontal hair," as usual. Larger hairs on dorsum of *thorax* arising from small chitinised plates ; lateral hairs arising from large tubercles, some of which have small thorn-like spines. *Abdominal segments* I–VI with projecting lateral tubercles carrying branched hairs. Comb of 35–45 fringed teeth on segment VIII. *Siphon* short and broad, with large acus at base and large valves at apex ; from 1·2–2·5 times length of diameter at base. Pecten extending along length of siphon, with 7–11 teeth, the majority of which have a single lateral denticle, but the two or three most distal teeth simple. Posterior surface of siphon with a zigzag row of long hairs from near base to apex ; one pair of smaller hairs anterior to pecten towards apex of siphon. *Anal segment* large, triangular in side view, and usually longer than siphon. Both *osc* and *isc* single and long; *lh* single, fairly long. Fan of about 14 branched hairs arising from fan-plate. Both pairs of papillæ small.

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* Christophers 1906, p. 10 (*concolor*) ; Barraud 1924*d*, p. 977 ; Senior-White 1927, pl. vi.

HABITAT.—Natural pools, shallow wells, domestic collections of water, etc.

DISTRIBUTION.—Common over larger part of Indian region from the PUNJAB to ASSAM, BURMA, CEYLON, and ANDAMANS. It has been found up to about 5,000′ in the Assam hills, but is commonest in the plains.

Known from MALAY PENINSULA, SIAM, COCHIN CHINA, DUTCH EAST INDIES, PHILIPPINES, and SOUTH CHINA.

196. **Culex (Lutzia) raptor** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 275 (♂ & ♀). TYPE-LOC.: Amritsar, Punjab, v. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ♀ *.—Very similar to *C.* (*L.*) *fuscanus* but differing as indicated in key; c.-v. 4–5 usually much nearer base of wing than 3–4, but position variable. Mesonotal scaling also subject to variation: in some specimens the scales are uniformly light brown without any indication of a pattern of pale scales; in others the scaling is mostly dark brown, with a similar pattern to that of *fuscanus*, but more distinct. Some specimens, in which the abdominal banding is yellower than usual, are difficult to separate from certain specimens of *fuscanus*.

♂.—Apical ⅓ of long segment of palpi and base of penultimate segment usually with paler scaling than in *fuscanus*, but this is not always very marked. *Hypopygium* (fig. 81, **b**): subapical lobe of coxite with usually 3 strong spines, but a fourth sometimes present; *lp* with a pronounced median toothed process. Ventral cornu, in side view, less tapering than in the other species; lateral process rounded.

LARVA †.—Very similar to that of *fuscanus*. In the material available it has not been possible to find any constant points of difference.

HABITAT.—As given for *fuscanus*.

DISTRIBUTION.—Commonest on western side of India from the PUNJAB, through BOMBAY and MADRAS PRESIDENCIES to CEYLON, but occurs also in CENTRAL PROVINCES, ORISSA, BENGAL, and BURMA. No specimens from Assam have been seen. It is often found in the same localities as *fuscanus*.

Recorded from COCHIN CHINA (*Borel*).

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* This and *C. fuscanus* sometimes approach one another closely in abdominal markings and venation, but the difference in structure of the ♂ phallosome appears to be constant: *vide* Barraud 1924 *c*, p. 974.

† Barraud 1924 *d*, p. 977.

197. **Culex (Lutzia) vorax** Edwards, 1921.

Bull. Ent. Res. xii, p. 327 (♂ & ♀). TYPE-LOC.: Tokyo, Japan (*Yamada*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Fairly distinct in abdominal markings from the other three species, and differs from *C.* (*L.*) *fuscanus* and *raptor* also in markings of hind femur, as indicated in key; c.-v. 4–5 generally nearer apex of wing than 3–4, but position variable, as in other species. Scaling of mesonotum variable and very similar to that of *raptor*. There is also some variation in width of pale apical bands on abdomen, and some specimens approach *halifaxi* in appearance. Palpi of ♂ with white scaling at bases of last two segments on upper side; otherwise scaling and hairs are mainly dark brown, but appearance varies according to angle of view, the apical segment sometimes appearing almost entirely light, but not definitely yellow as in *fuscanus*.

♂.—*hypopygium* (fig. 81, **c**): subapical lobe of coxite usually with only 3 strong bristles. Ventral cornu of *lp* tapering and pointed, and with a pronounced toothed median process; lateral process pointed.

LARVA ‡.—Very similar to those of *fuscanus* and *raptor*. In material available it has not been possible to discover any constant differences.

HABITAT.—As given for *fuscanus*.

DISTRIBUTION.—Occurs almost exclusively in mountainous localities in India. WESTERN HIMALAYAS: Kasauli hills *, common during rains (*Christophers* & *Barraud*); Bhowali *, Naini Tal dist. (*Rao*); Mussooree, Dehra Dun dist., x. 1906 (*Lefroy*): all 4–7,000′. EASTERN HIMALAYAS: Kurseong * and Mungpoo *, Darjeeling dist., 5–6,000′, ix. & x. 1922 (*Barraud*). ASSAM HILLS: Shillong * (*Jukes*, *Shortt*, *Fletcher*, *Barraud*); Cherrapunji * (*Fletcher*): Haflong *, Cachar Hills, viii. 1922 (*Barraud*); Mikir Hills *, Sibsagar dist., i. 1911 (*Christophers*): all 4–5,000′. BURMA: Kalaw *, Southern Shan States (*Christophers*). SOUTH INDIA: Coimbatore *, Nilgiri Hills, viii. 1928 (*Shaffi*).

Known also from HONG KONG and JAPAN.

198. **Culex (Lutzia) halifaxi** Theobald, 1903.

M.C. iii, p. 231 (♀). TYPE-LOC.: Dindings, Straits Settlements. TYPE: ♀ in Brit. Mus.

Culex multimaculosus Leicester, 1908, Cul. Malaya, p. 155 (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Culex aureopunctis Ludlow, 1910, Can. Ent. xlii, p. 195 (♀). TYPE-LOC.: Mindanão, Philippine Is. (*Eastman*). TYPE: ♂ in U.S. Nat. Mus.

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† Barraud 1924 *c*, p. 975; Martini 1931, p. 348.

‡ Barraud 1924 *d*, p. 977.

Adult †.—Very similar to *C.* (*L.*) *vorax*, but differs in abdominal markings as indicated in key, and the pale scales on outer side of hind femur are usually less numerous. It is a darker species than the other three. In some specimens the mesonotum is covered with brownish-black scales, with paler scales forming a very distinct pattern, as in some specimens of *raptor*. The dorsum of the abdomen may be entirely brownish-black, or there may be narrow pale ochreous or white apical bands, much as in some forms of *vorax*. Palpi of ♂ very similar to those of last-named species. ♂.—*Hypopygium* (fig. 81, **d**) : subapical lobe of coxite with 3–5 strong spines : *lp* with very pronounced median toothed process and a rounded lateral process.

Larva (fig. 82) ‡.—Very similar to those of other species ; no definite differences can be given.

Habitat.—Rice-fields (Assam, *Barraud*) ; street gulley-traps, disused ships' tanks, garden water-barrels, and other water-holding rubbish about habitations, and rarely in fresh tea-tree swamp : nearly always with *Culex fatigans* (Brisbane, Australia, *Cooling*) ; pool of dirty water in ravine (Suduganga, Ceylon, *Senior-White*) ; small ponds, road-side ditches, and jungle-pool (Malay Peninsula, *Leicester*).

Distribution.—Assam, Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*). Ceylon : Suduganga, Matale dist., iii. vi., x.–xii. 1919, and i. 1920 (*Senior-White*).

Known from Malay Peninsula, eastwards to Australia, Philippines, and South China.

Subgenus **BARRAUDIUS** Edwards, 1921.

Bull. Ent. Res. xii, p. 322. Genotype, *C. pusillus* Macq.

Adult.—Small mosquitoes without conspicuous ornamentation. Segment 1 of hind tarsi distinctly shorter than tibia. Pulvilli well developed. Scales on vertex of head, *apn*, and scutellum all narrow. Palpi of ♂ rather longer than proboscis, slender, and without projecting hairs. Coxite of ♂ hypopygium with scales on outer side ; lobe on coxite some distance from apex, with two projections, one carrying a single strong spine, the other several similar spines, but no leaflet. Style simple, with small terminal appendage. Phallosome divided into lateral plates, each with simple cornu, without teeth or processes. Paraproct with hairs or spines at crown ; no lateral arm.

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† Edwards 1913 *b*, p. 234 ; 1922 *c*, p. 275 ; 1922 *d*, p. 470 (syn.) ; 1924, p. 391 ; Barraud 1924 *c*, p. 975 ; Brug 1924 *b*, p. 26 ; Paine 1929, p. 309.

‡ Barraud 1924 *d*, p. 977 ; Cooling 1924, p. 14 ; Hill 1925, pl. viii [figured here from specimens in British Museum from Solomon Is.].

LARVA.—Mouth-parts normal; siphon short, with a single zigzag row of hairs on posterior border, much as in *Lutzia*.

DISTRIBUTION and BIONOMICS.—Only two species of this subgenus are known, both being found in the Mediterranean region; one extends eastwards to Kashmir, where it is fairly common. Little appears to be known of the habits of the adults, but *C.* (*B.*) *modestus* has been caught when biting man. The larvæ live in pools and swamps.

199. **Culex (Barraudius) modestus** Ficalbi, 1890.

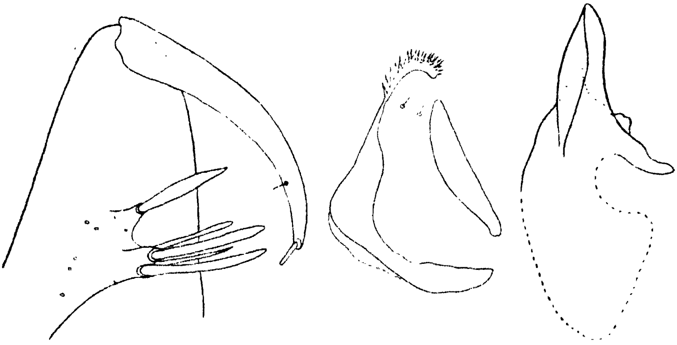
Bull. Soc. Ital. xxi, p. 93 (♀). TYPE-LOC.: Ravenna, Italy. TYPE: Pisa (?).

Culex eadithæ Barraud, 1924, Ind. Journ. Med. Res. xi, p. 1004 (♂). TYPE-LOC.: Sopor Village, Jhelum River, Kashmir, 2,200′, x. 1923 (*Sinton*). TYPE: ♂ in Brit. Mus.

ADULT *.—Rather small species: wing (♂) 3–3·5 mm., (♀) 4–4·5 mm.

♀.—*Head*: covered with brown or yellowish narrow scales, some broader pale ones low down on each side, and fairly numerous upright scales on nape. Tori yellowish-brown; flagellum of antenna, clypeus, palpi, and proboscis dark brown, the last pale beneath and usually at sides for whole length; palpi about $\frac{1}{6}$ length of proboscis. *Thorax*: integument of mesonotum brown, uniformly covered with chestnut-brown scales; scutellar scales rather lighter. Pleuræ pale brown, with a few small flat pale scales on sternopleura and upper part of mesepimeron. One lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: dark brown; fore and mid-

Fig. 83.



♂ hypopygial structures of *Culex* (*Barraudius*) *modestus* Fic. (end of coxite, with style; proctiger; phallosome).

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* Ficalbi 1899, p. 211; Edwards 1921 *c*, p. 332; 1926 *b*, p. 624; Martini 1931, p. 357.

femora lighter posteriorly ; hind femur pale, except dorsally, on both sides ; segment 1 of hind tarsi shorter than tibia. *Abdomen* : dorsum dark brown ; lateral rectangular pale ochreous patches on tergites, forming a continuous pale border on either side of abdomen. Sternites uniformly pale ochreous.

♂.—Markings very similar to those of ♀. Palpi slender, longer than proboscis by a little less than length of apical segment ; dorsally dark brown, underside pale, except for the dark apical segment ; underside of proboscis also pale ; no hair-tufts. *Hypopygium* : *vide* remarks under subgenus, and fig. 83.

LARVA *.—Has not been isolated in India. The following details are taken from figures and brief description by Gil Collado. The larva appears to be very similar to that of *C.* (*B.*) *pusillus*, described and figured by Edwards (1921, p. 333). *Antenna* with spicules on shaft, and hair-tuft at nearly ¾ from base, part of shaft beyond tuft darkened, 3 long spines at tip. Mouth-brushes normal. *Frontal hair A* of about 8 branches ; *B* and *C* at about middle of clypeus, *C* being slightly internal and posterior to *B*, both 3-branched. Numerous comb-teeth on abdominal segment VIII in a patch, individual teeth with rounded fringed apex. *Siphon* with a slightly zigzag row of branched hairs along posterior border from near base to apex. Pecten of about 12 teeth, the most distal one with about 5 lateral denticles along basal ½. *Anal segment* figured (by Gil Collado) as having a small chitinised saddle †. Both pairs of papillæ short ; fan not large.

HABITAT.—Ground-pools.

DISTRIBUTION.—Fairly common in the Jhelum Valley, KASHMIR (*Sinton*, *Fletcher*, *Barraud*). Not known from other parts of Indian region, but occurs in ASIA MINOR and MEDITERRANEAN REGION as far west as SPAIN.

Subgenus **NEOCULEX** Dyar, 1905.

Proc. Ent. Soc. Wash. vii, p. 45. Genotype, *C. apicalis* Adams (as *C. territans* Walk.).

Protomelanoconion Theobald, 1910, M.C. v, p. 462. Genotype, *P. fuscum* Theo.

ADULT (Indian species) ‡.—Small mosquitoes with dark tarsi, and without marked ornamentation. Mesonotal bristles strong and numerous. Scales on scutellum and on vertex of head all narrow. Palpi of ♂ from $\frac{1}{2}$–$\frac{5}{8}$ length of proboscis; those of ♀ quite short. Coxite of ♂ hypopygium without scales, but with subapical lobe bearing spine-like processes. Style simple, with small appendage. Phallosome divided into two lobes, upon which are numerous small spines or teeth.

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* Gil Collado 1930, p. 342 ; Martini 1931, p. 358.

† [The figure may represent a 3rd-stage larva ; in the related *C. pusillus*, as well as in most other species of *Culex*, the anal segment in the 4th-stage larva has a complete chitinous ring.]

‡ [Most of the non-Indian species differ from the two recorded here in having abdominal tergites apically banded and ♂ palpi as long as proboscis or longer. The Indian species belong to the *Protomelanoconion* group.]

Bucco-pharyngeal armature of ♀ with a row or pallisade of very numerous pointed teeth (fig. 80, **c**).

LARVA.—Very similar to those of several other subgenera. *Siphon* long and narrow, with about 5 pairs of hair-tufts. Pecten-teeth with lateral denticles along one side from base to apex.

DISTRIBUTION and BIONOMICS.—Twenty-three species have been classed in this subgenus by Edwards; only two of these are at present known in India, the others being scattered over Europe, Africa, Asia, and Australia, one occurring in America. *C.* (*N.*) *brevipalpis* is fairly common in parts of India where there is heavy rainfall, but *C.* (*N.*) *tenuipalpis* is known only from one locality. The larvæ of the latter were found in road-side pools; those of the former live in tree-holes, bamboos, etc. Very little is known of the habits of the adults of these two species, but Giles stated that the ♀ of *brevipalpis* bites during the day. Adults of this species have been caught in houses. [Several species of this subgenus have been found to suck the blood of frogs, and it has been suggested that this may be a common habit of species of this group of *Culex*.]

200. **Culex (Neoculex) brevipalpis** (Giles), 1902.

Handbook, 2nd ed. p. 384 (*Stegomyia*) (♂ & ♀). TYPE-LOC.: Shahjahanpur, U.P. (*Giles*). TYPE: ♂ & ♀ in Brit. Mus.

Culex longipes Theobald, 1901, M.C. ii, p. 68 (♀) (name preocc.). TYPE-LOC.: Singapore, vii. 1899 (*Hanitsch*). TYPE: ♀ in Brit. Mus.

Culex macropus Blanchard, 1905, Les Moustiques, p. 327 (nom. nov. for *C. longipes*).

Melanoconion uniformis Leicester, 1908, Cul. Malaya, p. 136 (♂ & ♀). TYPE-LOC.: Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Culex fidelis Dyar, 1920, Insec. Inscit. Mens. viii, p. 180 (♂ & ♀). TYPE-LOC.: Los Baños, Philippine Is., vii. 1915 (*Baker*). TYPE: 3 ♂♂ in U.S. Nat. Mus.*; also 2 allotype ♀♀, ix. & xi. 1917, same locality.

ADULT †.—Small dark species (wing about 2·5–3 mm.) characterized by peculiar form of ♂ palpi (fig. 84, **b**).

♀.—*Head*: narrow pale scales and upright yellow scales on vertex and nape, the upright scales numerous. Antenna,

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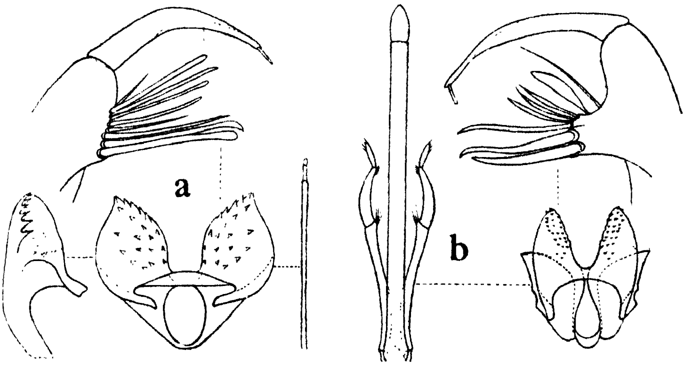
* Edwards 1929 *a*, p. 4.

† Edwards 1913 *b*, p. 237 (syn.); 1922 *d*, p. 472 (syn.); 1929 *a*, p. 4; Barraud 1924 *h*, p. 1277; Borel 1926, p. 114.

palpi, and proboscis dark brown; palpi about $\frac{1}{7}$ length of proboscis. *Thorax*: integument of mesonotum brown, a pair of submedian darker lines, a green tinge at sides; scales narrow and dark brown, lighter on front margin. Two rows of long black bristles from front margin of mesonotum to lateral lobes of scutellum, others over wing-roots, giving thorax a markedly bristly appearance. Scutellar scales narrow, dark brown. Pleuræ pale green or pale ochreous; *ppn* without scales, but with 3–4 bristles and some hairs; *apn* with very few pale scales anteriorly; a small patch of broad white scales on sternopleura; no lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: unusually long, dark brown, with bronzy sheen: femora paler beneath, as usual, especially hind pair. *Abdomen*: dorsum dark brown, with bronzy sheen; venter pale green, creamy on terminal segments.

Fig. 84.



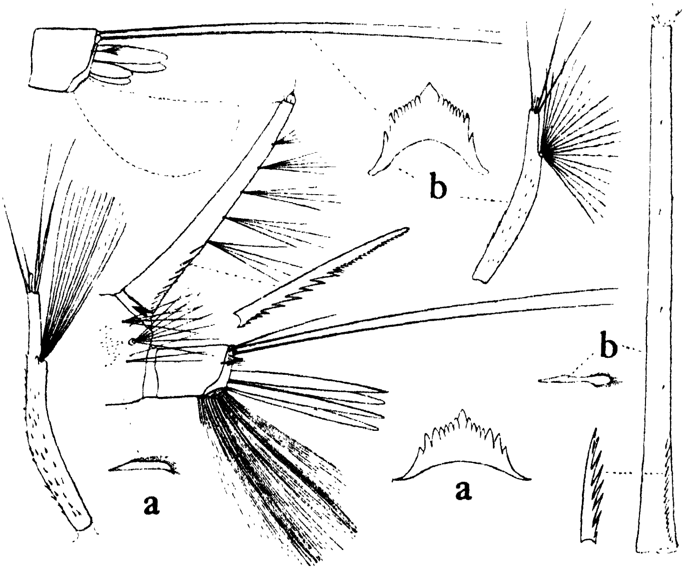
Structural details (♂ hypopygium and palpi) of *Culex*, subgenus *Neoculex*: **a**, *tenuipalpis*; **b**, *brevipalpis*.

♂.—Very similar to ♀. Palpi (fig. 84, **b**) dark brown, about $\frac{3}{5}$–$\frac{2}{3}$ length of proboscis (may appear shorter in dried specimens, as terminal segments often become distorted); long segment curved outwards at tip, with some short erect hairs externally and a few strong bristly hairs at tip, penultimate segment fairly long, curved (convexity above), with similar hairs, terminal segment short, with a fine strong bristle at tip. *Hypopygium* (fig. 84, **b**): subapical lobe of coxite with a leaflet and about 6 strong spines, 3 long and 3 shorter. Phallosome divided into two broadly conical lobes, with minute spines or teeth on apical part. Paraproct with spines at crown; no lateral arm.

Larva * (fig. 85, **b**).—Remarkable for the extreme length and narrowness of the siphon, which is 12–14 times as long as diameter at base, and for the reduction in size of the branched hairs on siphon.

Antenna slightly curved, shaft widest at about middle, with fairly numerous small spinelets along its length; a many-branched tuft of subplumose hairs, on outer side, at about ¾ of length from base; 3 long bristles at tip, and 1 very short. *Frontal hairs A*, *B*, and *C* with subplumose branches, the number of which is, respectively, 8–10, 2, 2.

Fig. 85.



Larval structures of *Culex*, subgenus *Neoculex*:
a, *tenuipalpis*; **b**, *brevipalpis*.

Hair *d* small, internal and anterior to *B* and *C*. Mouth-brush hairs simple; maxillæ very prominent. Preclypeal spines strong and of moderate length. Mentum with 8–10 teeth either side of unusually large central tooth. Some very long single hairs on *thorax*, and branched, barbed hairs, arising from tubercles, on meso- and metathorax laterally. *Abdomen*: long single and 2-branched hairs on I and II; those on following segments smaller, except for a very long single hair on either side of VII. Comb a triangular patch of about

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* Brug 1924 *a*, p. 440; Barraud 1924 *m*, p. 432; Borel 1926, p. 116; Senior-White 1927, p. 71.

50 small teeth, each tooth with swollen fringed apex. Subsiphonal tuft with 6–8 rather long subplumose branches. Branched hairs on *siphon* minute, usually 5 pairs, about evenly spaced, along length of tube beyond pecten; latter with 14–18 teeth, each tooth with lateral denticles along one side from base to apex. *Anal segment* enclosed in chitinous ring. Both *osc* and *isc* single and long; *lh* small, divided into several branches towards tip. Dorsal papillæ about length of segment, ventral pair shorter, but length rather variable. Fan rather short, about 12 hairs, each divided into a number of branches, attached to fan-plate.

HABITAT.—Tree-holes, bamboos; once in open iron tank (*Barraud*).

DISTRIBUTION.—Common over larger part of Indian region east of a line drawn from the western boundary of Nepal to Bombay. A number of other Indian mosquitoes have a very similar distribution.

Known also from MALAY PENINSULA, SIAM, COCHIN CHINA, and MALAY ARCHIPALAGO.

201. **Culex (Neoculex) tenuipalpis** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1278 (♂ & ♀). TYPE-LOC.: Sureil, near Mungpoo, Darjeeling dist., 5,500′, x. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Distinguished from *C.* (*N.*) *brevipalpis* by dark pleuræ and form of ♂ palpi *.

♀.—*Head*: pale brown narrow and upright scales on vertex and nape. Antennæ, palpi, and proboscis dark brown. Palpi $\frac{1}{8}$–$\frac{1}{7}$ length of proboscis. *Thorax*: mesonotal scales dark brown, bristles fairly numerous, especially over wing-roots, but less conspicuous than in *C.* (*N.*) *brevipalpis*. Scutellar scales narrow and brown. Pleuræ without scales, dark brown, except in region of coxæ and under wing-root, where colour is pale green; *ppn* with 4–6 bristles; 1 lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: fairly long; tibiæ and tarsi dark brown; fore and mid-femora pale posteriorly and ventrally; hind femur white on both surfaces, except dorsally towards extremity. *Abdomen*:

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* [Species rather closely resembling *C. tenuipalpis* are *C. hayashii* Yam. (Japan and China), with ♂ palpi $\frac{4}{5}$ proboscis, and *C. sumatranus* Brug (Sumatra and Hong Kong), with ♂ palpi only $\frac{2}{3}$ proboscis. Some species of the subgenus *Lophoceratomyia* are also very similar, especially *jenseni* de Meij. and *curtipalpis* Edw. All these differ in hypopygial structure and in the larva; from recent work by Dr. R. B. Jackson in Hong Kong it would seem that there has been some confusion in associating the larvæ and adults of some of these species, as he finds that a larva identical with that described by Edwards and Given as *curtipalpis* produces adults apparently indistinguishable from *sumatranus*, whereas Brug attributed a totally different larva to *sumatranus*.]

dorsum dark brown ; a fringe of pale hairs along apical margin of each tergite, and usually narrow basal pale bands. Venter brown, paler at base of each segment.

♂.—Very similar to ♀. Palpi about ½ length of proboscis, thin and straight, without hair-tufts ; terminal segment very small (fig. 84, **a**). Antennæ plumose. *Hypopygium* (fig. 84, **a**) : subapical lobe of coxite with a number of rod-like spines, but no leaflet. Lobes of phallosome of slightly different shape to those of *brevipalpis*, and with larger spines or teeth.

LARVA * (fig. 85, **a**).—Recognized by the unusual form and arrangement of frontal hairs. *Antenna* comparatively long, dark at base and on apical ½ : a fairly large hair-tuft at about ⅓ from base ; small spinelets on more than basal ½ of shaft ; 1 short and 3 long bristles at tip. *Frontal hair A* of about 6 long branches ; *B* of 2 branches, shorter than *A* ; *C* single, very short, standing behind *B* ; *d* small, single, or split towards tip, standing internal and anterior to *B*. Preclypeal spines dark and stout. Mentum sub-triangular, about 7 teeth either side of central one. Some long single hairs on *thorax*, and branched hairs arising from tubercles on meso- and metathorax laterally, as usual. *Abdominal* segment I with tubercles laterally, carrying 2 long hairs, one single, one 2-branched ; a similar 2-branched hair on II ; following segments with finer 2-branched hairs, but those on VII very long. Subsiphonal tuft and the 4 associated hairs all fairly well developed. Comb of 40–45 rather long, fringed teeth in triangular patch. *Siphon* pale in colour, widest at base, tapering to tip and slightly curved, 6–7 times length of diameter at base ; 5 pairs of hair-tufts along posterior border, about evenly spaced beyond pecten ; latter of 9–10 long teeth, with numerous denticles along one side from base to apex, those on apical ½ very small. Tracheæ within siphon very narrow. *Anal segment*, with its hairs and papillæ, as shown in fig. 85, **a**.

HABITAT.—Road-side pools.

DISTRIBUTION.—Known in INDIA only from type-locality, but also recorded from JAVA †.

Subgenus **MOCHTHOGENES** Edwards, 1930.

Bull. Ent. Res. xxi, p. 305. Genotype, *C. malayi* (Leic.).

ADULT.—Essentially as given for *Neoculex*, but palpi quite short in ♂ as well as ♀, and there are rather numerous flat scales on the head in two species. Subapical lobe of coxite of ♂ hypopygium with several spines, rod-like processes, and one or more leaflets, the latter very large in two species in which also the style is of unusual form. The Indian species are all small and dark coloured, without ornamentation, and the ♀♀ are difficult to separate from those of some of the smaller species in other subgenera. Bucco-pharyngeal armature of ♀ as in *Neoculex* in some species (*C. iphis*, in which the teeth are numerous and long), but in other species the teeth are shorter (*C. khazani*).

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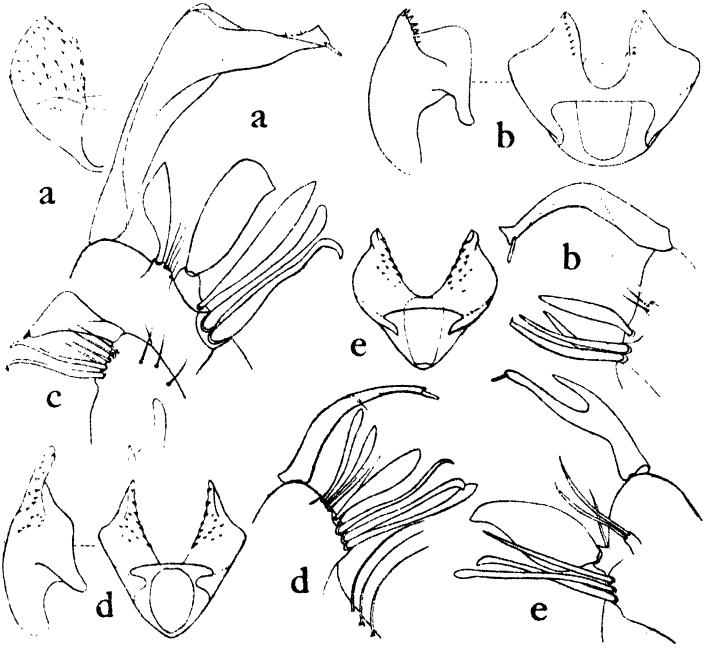
* Barraud 1924 *m*, p. 433. † Brug 1931, p. 38.

Fig. 86.



♂ hypopygial structures of *Culex*, subgenus *Mochthogenes* (style, appendages of coxite, phallosome): **a**, *khazani*; **b**, *iphis*; **c**, *castrensis*; **d**, *pluvialis*; **e**, *malayi*.

LARVA.—As in *Neoculex* (so far as known).

DISTRIBUTION and BIONOMICS.—Nine species are at present known, of which one is confined to Africa; five occur in India, and the remainder in Malaya or islands to the east of the Malay Archipelago. So far as is known, the larvæ live in tree-holes, small rock-pools, and sometimes in ground-pools. Nothing appears to be known regarding habits of the adults.

Key to Adults.

1. Integument of pluræ with a dark spot occupying larger part of mesepimeron ...	*khazani*, p. 357.
Integument of pleuræ without such spot (though in *malayi* and *castrensis* there is a dark area across upper part)..........	2.
2. Head mainly flat-scaled; style of ♂ hypopygium forked (fig. 86, **e**)	*malayi*, p. 358.
Head with large area of flat scales on each side, continued in front as a border to eyes nearly to middle point; some narrow and upright scales on vertex and nape; style of ♂ hypopygium not forked	*pluvialis*, p. 356.
Head mainly covered with narrow and upright scales, flat scales confined to a small area low down each side; style of ♂ hypopygium not forked	3.
3. Bristles on vertex pale; a dark area across upper part of pleuræ; very small species; style of ♂ hypopygium much swollen in middle; lobes of phallosome elongate and without distinct spines or teeth (fig. 86, **c**)............................	*castrensis*, p. 355.
Bristles on vertex dark; pleuræ uniformly dark brown; larger species; style of ♂ hypopygium not swollen in middle, but with enlarged tip (fig. 86, **b**); lobes of phallosome wide and short, and with a row of small teeth	*iphis*, p. 354.

202. **Culex (Mochthogenes) iphis** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1279 (♂ & ♀). TYPE-LOC.: Nilgiri Hills, South India, ix. 1915 (*Khazan Chand*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Size rather larger than other species of this subgenus. Wing 3·4–3·8 mm.

♀.—*Head*: narrow dull white and dark upright scales on vertex. Palpi and proboscis dark brown. Length of proboscis 2·2–2·4 mm., of palpi about 0·35 mm. *Thorax*: mesonotal scales dark brown, lighter on front margin; a number of long dark bristles, especially over wing-roots. Scutellar scales narrow and brown. Pleuræ dark brown, without scales or definite markings; one lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: dark brown; hind femur pale on basal ½ or more. *Abdomen*: dark brown dorsally, paler ventrally.

♂.—Antennæ only moderately plumose, appearing less hairy than in the other species. Proboscis 2·2–2·4 mm. long, palpi about 0·38 mm., apical segment longer than penultimate. Other details as in ♀. *Hypopygium* (fig. 86, **b**): subapical lobe of coxite with one leaflet and 3 strong curved spines. Style somewhat widened at tip. Lobes of phallosome with only a single row of minute spines or teeth.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

203. **Culex (Mochthogenes) castrensis** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 285 (♂ & ♀). TYPE-LOC. : Castle Rock, North Kanara (*James*). TYPE : ♂ & ♀ in Brit. Mus.

Aëdes nigrescens Theobald, 1907, M.C. iv, p. 540 (in part). TYPE-LOC. and TYPE : as above.

As I have not seen any specimens of this species, I quote Edwards's original description * :—" A small dark species, almost devoid of ornamentation. Dorsal surface of head apparently covered with small, whitish, narrow, curved scales, perhaps some flat ones also, but these difficult to make out owing to the poor condition. Vertical bristles whitish, but the orbital bristles dark as usual. Palpi alike in the two sexes, slender, exceeding the clypeus by about twice its length. Mesonotum with dark narrow scales, some white ones round the front margin. Pleuræ damaged, but apparently with dark markings : a dark stripe across the upper part, and a dark patch lower down ; no conspicuous white scales. Abdomen dark above, paler below. Male hypopygium : lobe of side-piece with two long rods, hooked at tips, and several undifferentiated bristles; apparently no leaf. Clasper entire, but much swollen in the middle. Lobes of mesosome elongate, nearly straight, rounded at tips, without small spines †. Tenth sternites with crown of spines, no basal arm.

" The specimens on which this description is based are those which were labelled by Theobald as the type ♂ and ♀ of his *Aëdes nigrescens*, from Castle Rock, India (*James*). The name *nigrescens* must be considered as preoccupied by *Danielsia nigrescens* Theo., described earlier in the same volume, which is also a species of *Culex*. Moreover, it is certain that Theobald's *Aëdes nigrescens* was described from specimens of two distinct species. The male which he figured, and on which his conception of the species was mainly based, is an example of *C. malayi* Leic. The remaining specimens, which provided the material for his description of the head and thorax, are different, as is clearly shown by the scaling of the head (*C. malayi* having the dorsal surface of the head almost covered with small flat scales) and by the structure of the hypopygium, which is as described above. It was certainly a remarkable coincidence, amply sufficient to excuse the error, that Theobald should receive in the same collection, from the same place, two Oriental *Culex* with short male palpi, when no such species was known previously."

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* See also Barraud 1924 *h*, p. 1280.

† [Actually there are several small tubercles.]

♂.—*Hypopygium* as in fig. 86, **c**.

LARVA *.—[As figured by Senior-White this has some resemblance to *C.* (*M.*) *khazani*, but differs in many respects, as follows :—*Frontal hairs A*, *B*, and *C* all simple (*i. e.*, not plumose) ; *A* 3–4-branched, *B* and *C* 2-branched, but much shorter than in *khazani* ; *B* not nearly reaching front edge of clypeus, *C* much shorter even than *B*, and placed almost directly behind *B*. *Comb* with fewer, shorter, and broader teeth. *Siphon* quite straight, very slightly and evenly tapering, barely 6 times as long as diameter at base. Pecten with the distal teeth almost 3 times as long as those at base. Siphonal tufts at least twice as long as diameter of tube.]

DISTRIBUTION.—The typical form is known only from NORTH KANARA (type-locality), and from Suduganga and Marble, CEYLON (*Senior-White*) †.

204. **Culex (Mochthogenes) pluvialis** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1281 (♂ & ♀). TYPE-LOC. : Kadra, North Kanara, ix. 1921 (*Barraud*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—Very similar to *khazani* and *malayi*, but differs as follows :—A large area of flat scales on each side of head, the flat scales continued as a border to eyes nearly to middle in front, but less numerous than in *malayi* and lighter in colour ; vertex with narrow curved and upright scales.

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* Senior-White 1927, pl. x.

† [Brug (1932*a*, p. 82) has described a var. *foliatus*, from Java, which differs from the type-form in having the ♂ coxite " adorned with six fairly broad leaves instead of two rods and four bristles " ; the larva, according to Brug, agree closely with Senior-White's description, except that the comb-scales are broader (he should have said *narrower* ; the figures he gives are accidently reversed). One isolated skin and two whole larvæ from Brug's material are in the British Museum ; these agree with Senior-White's figure in all the points noted above except the form of the comb-scales ; the lateral hairs of abdominal segments I and II are not noticeably thickened, this being another striking distinction from *khazani*.

This variety of the species occurs in Hong Kong, where larvæ and adults were collected by Dr. R. B. Jackson in 1932–3. The Hong Kong adults are closely similar to the South Indian types, but as they are in better condition it is possible to see that there is a narrow border of small flat scales adjoining the eyes in front. ♂ *hypopygium* with style formed as in the type, but coxite bearing one large twisted leaf, two long, bent, and flattened rods, and four or five short leaflets with pointed tips (this seems to be the structure in Brug's type also, his figure and description being rather incorrect; the specimen not being stained it is not very easy to make out fine details) ; *lp* with numerous tubercles. The Hong Kong larvæ are in all respects similar to those from Sumatra, except that frontal hair *B* is very slightly plumose (much less no than in *khazani*) ; they were found in a shaded pool in the bed of a stream, in company with *Uranotænia annandalei*.]

Length of proboscis, ♀ 1·3–1·4 mm., ♂ 1·5 mm.; length of palpi, ♀ 0·21, ♂ 0·4 mm.; palpi of ♂ longer in proportion to those of ♀ than in *khazani*. Pleuræ dark, without a definite black spot on mesepimeron. One or two lower mesepimeral bristles. Wing, ♀ 3 mm., ♂ 2·3 mm.

♂.—*Hypopygium* (fig. 86, **d**): subapical lobe of coxite with 3 leaf-like processes and 3 long, hooked, or clubbed spines. Style simple, narrow at apex, but not noticeably widened in middle, with terminal appendage. *lp* pointed, with fairly numerous minute teeth or spines.

Larva.—Unknown.

Habitat.—Small rock-pools in jungle.

Distribution.—Known only from type-locality.

205. **Culex (Mochthogenes) khazani** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 286 (♂ & ♀). Type-loc.: Pudupadi, Malabar Coast, xi. 1915 (*Khazan Chand*). Type: ♂ and allotype ♀ in Brit. Mus.

Adult *.—A small, dark mosquito (wing about 2·5 mm.), distinguished from allied species by presence of a black spot occupying larger part of mesepimeron.

♀.—*Head*: vertex and nape covered with narrow and upright scales, mostly pale in colour; some white and dark flat scales at sides. Antennæ, palpi, and proboscis brownish-black; proboscis slightly longer than fore femur, palpi about $\frac{1}{6}$ length of proboscis, latter often with appearance of pseudo-joint, or slight kink, at about $\frac{2}{3}$ from base. *Thorax*: integument of mesonotum and scales brownish-black, fairly numerous and rather long black bristles; an elliptical darker area at sides over wing-roots. Pleuræ without scales, pale ochreous or greenish, a dark area occupying larger part of mesepimeron; one lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: brownish-black; fore and mid-femora pale beneath, hind femur conspicuously white, except at tip and dorsally on distal $\frac{1}{3}$. *Abdomen*: tergites brownish-black, sternites brown or pale brown.

♂.—Very similar to ♀. Antennæ plumose. Palpi only very slightly longer than in ♀. *Hypopygium* (fig. 86, **a**): form of style and of processes arising from subapical lobe of coxite distinctive. Phallosome similar to that of *C.* (*N.*) *tenuipalpis*, but teeth or spines more numerous and more variable in size.

Larva.—Not known with certainty, but some which were preserved from a batch, from which only adults of this species were reared, all have the following characters:—Length about 5–6 mm. including siphon. *Head* moderately large. *Antenna* fairly long, almost uniformly dark; shaft with

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* Edwards 1922 *b*, p. 92; Barraud 1924 *h*, p. 1281.

small spicules ; a well-developed fan-shaped tuft at about $\frac{3}{4}$ from base, branches strongly plumose. Two long subapical bristles ($\frac{2}{3}$ length of antenna) very near tip of shaft ; one apical bristle about $\frac{1}{2}$ length of subapical, and one quite small. *Frontal hairs A*, *B*, and *C* with 6–8, 2, and 3 branches respectively, but *B* and *C* sometimes single ; branches of last two strongly plumose and long (reaching to tips of preclypeal spines or beyond) ; *C* distinctly internal to *B* ; *d* fine and simple, fairly long, slightly anterior and internal to *B* ; *e* with 4–5 fine branches. Mouth-brushes fairly large, hairs simple. Preclypeal spines stout and conspicuously dark. Some long single and 2-branched hairs on prothorax, and long branched hairs on meso- and metathorax laterally, some of the branches being very long. *Abdominal* segment I with a very long and strong, barbed, 2-branched hair, and one similar single hair ; II with one similar single or 2-branched hair. Hairs on following segments much finer and shorter, but a long 2–3-branched hair on each side of VI, much longer than any hair on VII. Comb of very many long narrow teeth in a patch. Subsiphonal tuft of 5–8 subplumose branches. *Siphon* long and narrow, about 10 times length of diameter at base, slightly tapering on basal $\frac{1}{3}$, then almost parallel-sided to tip, with a slight but perceptible double curve near base. Pecten of 8–12 long teeth similar in form to those of *tenuipalpis*, distal teeth not very much larger than those at base ; usually 6 pairs of very small branched hairs (not longer than diameter of tube), evenly spaced, along siphon. *Anal segment* very similar to that of *tenuipalpis*, but papillæ shorter, hardly as long as segment.

HABITAT.—Tree-holes.

DISTRIBUTION.—MALABAR COAST : Pudupadi *, type-locality, as given above. NORTH KANARA : Kadra *, ix. 1921 (*Barraud*).

Not known from elsewhere.

206. **Culex (Mochthogenes) malayi** (Leicester), 1908.

Cul. Malaya, p. 184 (*Aëdes*) (♂ & ♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♂ & ♀ in Brit. Mus.

Aëdes nigrescens Theobald, 1907 (in part), M.C. iv, p. 540 (name preocc.) (♀). TYPE-LOC. : Castle Rock, North Kanara (*James*). TYPE : ♀ in Brit. Mus.

Aioretomyia aëdes Leicester, 1908, Cul. Malaya, p. 189 (♂). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♂ in Brit. Mus.

ADULT †.—Very similar to allied species, but differs in head-scaling and coloration of pleuræ. In some specimens there are narrow basal pale bands on abdomen. Wing 2–3 mm.

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† Edwards 1917, p. 228 (*Micraëdes*, syn.) ; 1922, p. 286 (syn.) ; Barraud 1924 *h*, p. 1282 ; Borel 1926, p. 117.

♀.—*Head*: mainly covered with small light-coloured flat scales, a small area of narrow scales in middle of vertex; upright scales scattered over vertex and nape, the last appearing dark. Antennæ, palpi and proboscis brownish-black; palpi about $\frac{1}{6}$ length of proboscis. *Thorax*: mesonotum covered with brown narrow scales; bristles not very numerous or long. Pleuræ dark on upper $\frac{1}{2}$, greenish below, the two areas usually fairly sharply defined; 4–6 *ppn* bristles, one lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: deep brown, fore and mid-femora lighter posteriorly; hind femur mainly pale, but narrowly brown dorsally from near base to knee. *Abdomen*: brownish-black dorsally, some specimens with narrow basal pale bands.

♂.—Palpi about $\frac{1}{5}$ length of proboscis; antennæ plumose. Other details as in ♀. *Hypopygium* (fig. 86, **c**): differs from that of all allied species in form of style, which is divided into two arms. Subapical lobe of coxite with a very large leaflet and several other processes.

LARVA *.—From figures and a brief description of this larva by Borel from Cochin China it appears to be very similar to those of *tenuipalpis* and *khazani*, differing from the latter in having 5 fairly well-developed pairs of tufted hairs on the siphon, and from the former in having a smaller number of teeth in the comb (about 20 instead of 40 or more), the teeth also being more pointed. Siphon from 5–6 times length of diameter at base; pecten of 9–10 teeth, resembling those of *tenuipalpis* in form, distal teeth apparently not very long; tufts longer than diameter of tube.

DISTRIBUTION.—Fairly common from the PUNJAB (Lahore, Karnal) to ASSAM, BURMA, and ANDAMANS, and through PENINSULAR INDIA to MADRAS. Probably, owing to its small size, it is frequently overlooked.

Known also from MALAY PENINSULA and ARCHIPELAGO as far south-east as TIMOR, and from COCHIN CHINA and SOUTH CHINA (Hangchow, *Feng-Swen Li*).

Subgenus **LOPHOCERATOMYIA** Theobald, 1905.

Ann. Mus. Nat. Hung. iii, p. 93. Genotype, *L. fraudatrix* Theo.

Philodendromyia Theobald, 1907, M.C. iv, p. 623. Genotype, *P. barkeri* Theo.

Cyathomyia de Meijere, 1910, Ann. Jard. Bot. Buitenzorg (2) iii, p. 921. Genotype, *C. jenseni* de Meij.

ADULT.—Small to medium-sized mosquitoes, brownish-black or reddish-brown in colour. Vertex of head usually with numerous small flat scales in front towards eye-margins. Proboscis and palpi dark brown, without pale rings. Scutellar

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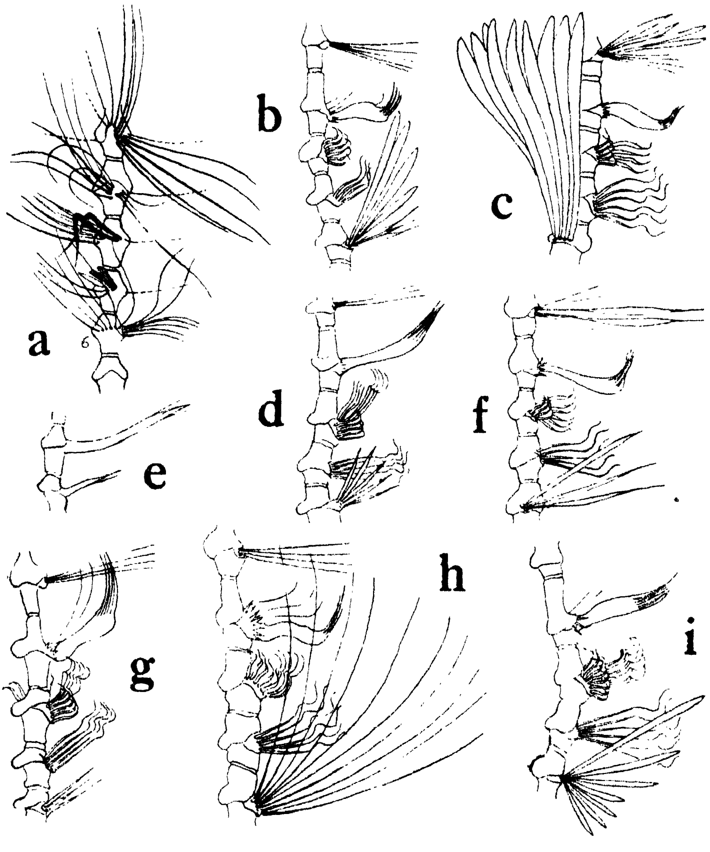
* Borel 1926, p. 118.

scales narrow. Lower mesepimeral bristle usually present. Tarsi entirely dark. Wing-scales dark and usually very scanty, except towards tip of wing. Palpi of ♂ (in known Indian species) a little longer than proboscis, and slender. Antennæ of ♂ with a matted tuft of hairs on segment 9 (the torus being counted as segment 1) *, and usually with other matted or twisted tufts on segments 6–9 or 10. On segment 6 there are, in a number of species, scales or thickened hairs,

Fig. 87.



Modified segments (6–10) of ♂ antennæ of *Culex*, subgenus *Lophoceratomyia*: **a**, *seniori*; **b**, *mammilifer*; **c**, *fraudatrix*; **d**, *minor*; **e**, *minutissimus*; **f**, *cinctellus*; **g**, *plantaginis*; **h**, *flavicornis*; **i**, *uniformis*.

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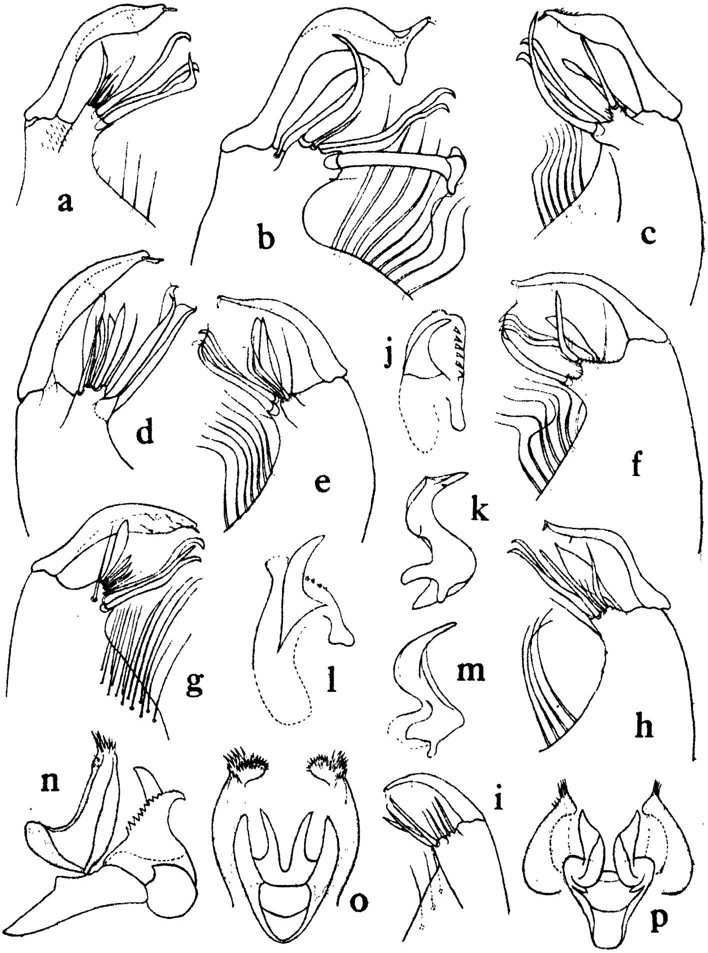
* Strictly speaking, the torus is the second segment.

and the number and length of these are of diagnostic importance. The torus may, or may not, have a blunt prominence on inner side. ♂ hypopygium very similar in structure to species of the subgenera *Neoculex* and *Mochthogenes*. Bucco-pharyngeal armature of ♀ with a concave row of long teeth (fig. 80, **d**). So far as investigations have been

Fig. 88.



♂ hypopygial structures (tip of coxite with style, phallosome from side or with proctiger) of *Culex*, subgenus *Lophoceratomyia* : **a**, **m**, *fraudatrix* ; **b**, *flavicornis* ; **c**, **l**, *mammilifer* ; **d**, *seniori* ; **e**, **j**, *minor* ; **f**, **o**, *plantaginis* ; **g**, *cinctellus* ; **h**, **n**, *uniformis* ; **i**, **k**, **p**, *minutissimus*.

made there do not appear to be marked differences in the number and arrangement of teeth in closely allied species.

LARVA.—Those of most species do not show any marked differences from those of other subgenera, but that of *uniformis* is remarkable in having the integument of the body covered with small hairs.

DISTRIBUTION and BIONOMICS *.—Several species are fairly common over large tracts of the Indian region, but are most numerous in forested regions of heavy rainfall. About 25 species are known in all, and these are confined to the Oriental and Australasian regions. Ten occur in India; these mostly breed in tree-holes, but the larvæ of some live in ground-pools, shallow wells, etc. The adults do not appear to attack man, but little is known regarding their habits.

Key to Adults.

♂♂.

1.	Abdomen with transverse basal pale bands on dorsum	2.
	Abdomen without pale bands on dorsum	5.
2.	Mesonotal scales dark brown or brownish-black; segment 7 of antenna without a bunch of crumpled scales	3.
	Mesonotal scales light brown or reddish-brown; segment 7 of antenna with a bunch of crumpled scales	4.
3.	Segments 7, 10, and 11 of antenna with some fairly short, thickened hairs; style somewhat expanded on apical ½ (fig. 87, a)	*seniori*, p. 365.
	Segments 7, 10, and 11 of antenna without modified thickened hairs, style tapering from base to apex (fig. 87, e)	*minutissimus*, p. 363.

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* [The species of this subgenus may be classed in three groups, according to their breeding habits, and there are also structural distinctions between these groups, which are:—(1) Those which breed only in ground-pools and have the torus of ♂ antenna simple, without blunt prominence on inner side; palpi of ♂ longer than proboscis, with last two segments usually distinctly hairy; proboscis of ♂ usually with a row of stiff bristles beneath at base. This group includes *minutissimus*, *seniori*, *cinctellus*, *rubithoracis*, and *fraudatrix* among Indian species. (2) Those which breed mainly in rock-pools, tree-holes, or bamboos, and have the torus of ♂ antenna with a blunt prominence on inner side; palpi of ♂ as long as proboscis or longer, but with few or no hairs at tip; ♂ proboscis without stiff bristles at base beneath. This includes the remainder of the known Indian species. (3) Those which breed mainly or exclusively in pitcher-plants, have a blunt prominence on inner side of torus of ♂ antenna, and palpi of ♂ shorter than proboscis and bare. This includes six Oriental species: *cœrulescens*, *curtipalpis*, *eminentia*, *hewitti*, *jenseni*, and *navalis*; none of these have yet been found in the Indian area, but some probably occur. For distinction between the pitcher-plant forms, *vide* Edwards 1928, p. 275, and Edwards & Given 1928, p. 353.]

4.	Mesonotal scales reddish-brown; basal segment (torus) of antenna without a blunt prominence	*cinctellus*, p. 366.
	Mesonotal scales light brown, torus of antenna with a blunt prominence	*plantaginis*, p. 372.
5.	Torus of antenna without prominence	6.
	Torus of antenna with prominence	7.
6.	Palp with a small finger-like process at base; proboscis with a transverse row of about 6 fairly long stiff bristles on underside at base; antenna with a tuft of 12 or more long scales on segment 6 (fig. 87, **c**)	*fraudatrix*, p. 368.
	Palp without a finger-like process, but with two small dense projecting tufts of hair near base; proboscis with a transverse row of 10–12 stiff bristles on underside at base; antenna with about 3 long pointed scales on segment 6	*rubithoracis*, p. 367.
7.	Antenna with a tuft of long bright yellow hairs on segment 6	*flavicornis*, p. 375.
	Antenna with a tuft of dark brown hairs or scales on segment 6	6.
8.	Palp with a row of stiff bristles on outer side near base	*mammilifer*, p. 374.
	Palp without a row of stiff bristles	9.
9.	Palp longer than proboscis by more than length of apical segment, last two segments distinctly hairy; antenna with a tuft of scales on segment 6, some of which are broad and very long (fig. 87, **i**)	*uniformis*, p. 373.
	Palp longer than proboscis by less than length of apical segment, last two segments with few hairs; segment 6 of antenna with a tuft of narrow hair-like scales all about same length (fig. 87, **d**)	*minor*, p. 370.

207. Culex (Lophoceratomyia) minutissimus (Theobald), 1907.

M.C. iv, p. 235 (*Culiciomyia*) (♀). Type-loc.: Peradeniya, Ceylon (*Green*). Type: ♀ in Brit. Mus.

Culiciomyia nigerrima Theobald, 1910, M.C. v, p. 233 (♀). Type-loc.: Trincomalee, Ceylon, x. 1907 (*Green*). Type: ♀ in Brit. Mus.

Melanoconion juxtapallidiceps Theobald, 1910, M.C. v, p. 456 (♀). Type-loc.: Trincomalee, Ceylon, x. 1907 (*Green*). Type: ♀ in Brit. Mus.

Adult [*].—Small species with banded abdomen and comparatively simple ♂ antennæ [†]. Wing 2 mm. (♂) to 3 mm. (♀).

Head: scales mainly dark brown, some paler brown scales on vertex and whitish flat scales at sides. Antennæ, clypeus, palpi, and proboscis dark brown. Antenna of ♂ without a prominence on inner side of torus; segments 6 and 7

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[*] Edwards 1913 *b*, p. 235 (syn.); 1922 *c*, p. 280 (syn.); Barraud 1924 *j*, p. 41.

[†] [The only other Oriental species with similar characters is *C. infantulus* Edw., of Hong Kong, which differs slightly in ♂ hypopygium.]

without specialized hair-tufts, a small tuft of scales on 8, and a rather larger similar tuft on 9. Palpi of ♀ about $\frac{1}{7}$ length of proboscis; those of ♂ very slightly longer than proboscis, terminal segments with few hairs; a transverse row of long stiff bristles on underside of proboscis at base; a small dense tuft of hairs near base of each palp. *Thorax*: mesonotal scales brownish-black; fairly numerous dark bristles. Pleuræ light brown, darker in some specimens; one lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: dark brown, femora faintly paler posteriorly. *Abdomen*: dorsum brownish-black, with narrow ochreous basal bands; sternite brown or light brown.

♂.—*Hypopygium* (fig. 88, **i**, **k**, **p**): essential points of structure shown in figures; *lp* pointed, without small teeth or tubercles or large median process.

LARVA *.—*Antenna* comparatively large; shaft widest at about middle: spinelets along most of the length; dark at base and beyond hair-tuft: latter at about $\frac{3}{4}$ from base. Two strong preapical spines arising some little distance from tip of shaft, 2 weaker apical spines, one about $\frac{1}{3}$ length of other. *Frontal hair A* of 8–10 subplumose branches; *B* and *C* each of 2 long branches, but one or both may be single. Hair *d* anterior and internal to *B* and *C*, fine, fairly long, single or split towards tip. Preclypeal spines strong, dark, pointed. Mouth-brushes well developed, hairs simple. Some very long, single, unbranched hairs on thorax as well as the usual lateral branched hairs. *Abdomen*: segment I with 2 long lateral hairs, one usually 3-branched, the other 2-branched: a similar 2-branched or single hair on segment II: following segments with fairly long but weaker lateral hairs. Subsiphonal hair of 8–10 subplumose branches. Comb of about 40 long narrow teeth in a triangular patch. *Siphon* long and narrow, 7–9 times length of diameter at base. A fairly wide dark ring at base, and another wider dark ring at about middle. Pecten of about 12 teeth, with large lateral denticles from base to apex along one side; usually 4 pairs of small 2-branched hairs, fairly evenly spaced along tube from end of pecten to apex. *Anal segment* enclosed in chitinised ring; numerous small spines towards posterior border dorsally; *lh* of 3 fine short branches; *isc* usually of 4 branches, one very long, three short: *osc* single and long. Fan only moderately developed, about 12 hairs arising from fan-plate, each split into a number of branches. Papillæ from $\frac{1}{2}$–$\frac{3}{4}$ length of anal segment, both pairs pointed.

HABITAT.—Rock-springs, pools in ravines and river-beds, artificial collections of water in coconut-shells, etc.; shallow wells; stagnant water in shaded culverts, etc.

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* Senior-White 1927, pl. x.

DISTRIBUTION.—Fairly common from the PUNJAB to ORISSA, and through PENINSULAR INDIA to CEYLON. There are no records from Bengal, Assam, or Burma. It is probably frequently overlooked owing to its small size. It has been recorded from the islands of CELEBES, PANTAR, and ALOR (*Brug*).

208. **Culex (Lophoceratomyia) seniori**, sp. n.

TYPE-LOC.: Calcutta, Garden Reach, x. 1931 (*Senior-White*).
TYPE: ♂ in Brit. Mus.

ADULT.—Related to *minutissimus*, but differs in having either modified hairs or scales on segments 7–11 of antenna (fig. 87, **a**) and in structure of hypopygium (fig. 88, **d**). Wing about 2 mm.

♂.—*Head*: dorsum covered with dark narrow and upright scales, a patch of bluish-grey scales at each side. Palpi and proboscis dark brown. Palpi longer than proboscis by rather less than length of apical segment; last two segments with fairly numerous outstanding hairs. A transverse row of 10 long stiff bristles at base of proboscis beneath and two small, dense, projecting tufts of hairs near base of each palp. Antennæ strongly plumose, without prominence on torus; segment 6 simple; 7 and 8 with some short thick hairs, 8 also with a number of short, wide dark scales; 9 with about 6 wide dark scales with long pointed tips; 10 and 11 with 5–6 moderately long thickened hairs. *Thorax*: mesonotal scales dark brown, scutellum and scales appearing lighter. Postnotum dark in middle, paler at sides. Pleuræ brown, without scales. *Legs*: dark brown, femora paler beneath, as usual. *Abdomen*: tergites brownish-black, with well-marked basal ochreous bands. *Hypopygium* (fig. 88, **d**): coxite with a group of about 14 straight hairs on dorsal border, not forming a row, and continued from near base to subapical lobe; latter with 3 rod-like processes, all about same length, two slightly curved, with hooked tips, one straighter, with filamentous tip; also a leaflet and several other leaf-like or sword-like processes. Style slightly expanded along apical ½, with a rather long hair projecting from inner side. *lp* with long, smooth, pointed apex, projecting at right angles to basal part as in *C.* (*L.*) *fraudatrix*. Paraproct (when mounted flat) with smooth rounded projection at apex, a number of strong spines and 2–3 small strong hairs just below.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

209. **Culex (Lophoceratomyia) cinctellus** Edwards, 1922.

Ind. Journ. Med. Res. x, pp. 281 & 473, nom. nov. for *L. tæniata* Leic.
Lophoceratomyia tæniata Leicester (nec Wiedemann), 1908, Cul. Malaya, p. 127 (♂ & ♀). TYPE-LOC.: Kuala Lumpur and Klang, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—Distinguished by banded abdomen and antennal structure of ♂. Wing about 3 mm.

♀.—*Head*: narrow and numerous upright dark brown scales on vertex and nape, dark brown scales flat on either side, and greyish-white flat scales lower down at sides. Palpi and proboscis dark brown. Palpi about $\frac{1}{8}$ or $\frac{1}{7}$ length of proboscis. *Thorax*: mesonotum deep reddish-brown; pleuræ pale brown. *Legs*: deep brown, femora paler beneath, as usual. *Abdomen*: tergites brownish-black, with well-marked basal transverse ochreous bands.

♂.—Coloration and markings as in ♀. Palpi longer than proboscis by a little less than length of apical segment, last two segments with numerous outstanding hairs. Length of proboscis about 1·8 mm., and of segments of palp, respectively, 1·4 0·34, and 0·35 mm. A transverse row of stiff bristles on underside of proboscis at base, and two small, dense, projecting hair-tufts near base of each palp, as in some other species. Antenna (fig. 87, **f**) without a prominence on torus; 5–6 rather large scales on segment 6, matted and twisted tufts on segments 7–9; about 4 very long scales on segment 10, also some rather short thick hairs on this segment, as well as on segment 11. *Hypopygium* (fig. 88, **g**): coxite with a collection of straight hairs near dorsal border, not forming a row, as in some other species; subapical lobe with 3 slightly curved rods, two with hooked tips and one with expanded apex (this expansion can usually only be clearly seen in stained preparations), also 2 leaflets, one rather wide. Style broader on apical $\frac{1}{2}$ than on basal. *lp* resembling *fraudatrix* and *minutissimus*.

LARVA †.—The following description of what was thought to be the larva of this species is taken from Edwards and Given (1928):—" *Head* broader than long, but not so large as in *C. fraudatrix*, pale in colour. Clypeal spines slender, bristle-like, curved. Clypeal tufts *A*, *B*, and *C* each with about eight slightly plumose branches, *C* very obliquely behind *B*, and neither of them reaching appreciably beyond the front of the head. *Antennæ* entirely pale, moderately slender, and scarcely curved, not more than two-thirds as long as the head; shaft with numerous small spicules. Tuft placed at three-fifths, composed of about 12 slightly

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* Edwards 1922 *d*, p. 473; Barraud 1924 *j*, p. 42.

† Edwards & Given 1928, p. 353.

plumose branches, which do not reach beyond tip of shaft. Subapical hairs slender, pale, placed very close to the tip and not more than half as long as the shaft. *Mentum* with a rather small median tooth, and about ten teeth on each side of this, two or three on each side being larger and more detached. *Thorax* with the lateral tufts large; prothoracic hairs only just reaching front of head, the innermost hair double. *Abdomen* much as in *C. fraudatrix*; subsiphonal tuft less heavily plumose; comb-teeth pale. *Anal segment* with the posterior margin of the plate finely spinose (about 10–12 short spines). Inner dorsal hair simple. Brush composed of 6–8 small tufts, which have at most 4 or 5 branches, the transverse bars not well developed. Gills thick, rather blunt-ended, twice as long as the plate. *Siphon* brownish; slightly tapering on basal half, then almost parallel-sided; index about 6–6·5. Four pairs of small latero-ventral tufts which are mostly two-branched, the branches simple and about as long as the diameter of the siphon. Pecten of about ten teeth, which are rather short, with a row of five or six denticles on one side, several of these being as long as the main tooth.

"The adults issuing from these larvæ were unfortunately lost, and their identity is therefore uncertain †; from naked-eye appearance they seemed to be *Lophoceratomyia* with banded abdomen, and were therefore regarded as *C. cinctellus*."

DISTRIBUTION.—MALABAR COAST: Pudupadi *, x. 1915 (*Khazan Chand*).

Known also from MALAY PENINSULA *, BORNEO, SUMATRA, and JAVA.

210. Culex (Lophoceratomyia) rubithoracis Leicester, 1908.

Cul. Malaya, p 119 (♂ & ♀) TYPE-LOC: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT ‡.—Very similar to *cinctellus*, but abdomen unbanded. Wing about 2·5 mm.

♀.—*Head*: vertex and nape covered with pale narrow scales and numerous brown upright scales, some flat brown scales laterally, and below these, at sides, a patch of bluish-grey flat scales, the last extending dorsally as a narrow border to eyes. Palpi and proboscis dark brown. *Thorax*: mesonotum reddish-brown or yellowish-brown, with scanty covering of narrow brown scales. Pleuræ pale brown, without scales. *Legs*: dark brown; undersides of femora paler. *Abdomen*: dorsum entirely dark brown; venter paler.

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† [The slender, pale, preclypeal spines and simple *isc* of this larva distinguish it from all others of the subgenus *Lophoceratomyia* hitherto known, though both these features occur in all the known larvæ of Oriental species of the subgenus *Culiciomyia*. In the spinose margin of the chitinous ring of the anal segment this larva resembles *C. viridiventer* and *C. shebbearei*, but differs from both these in the position of the antennal tuft.]

‡ Edwards 1922 *c*, p. 287.

No very definite characters can be given which distinguish this from ♀♀ of several allied species.

♂.—General coloration as in ♀. Palpi longer than proboscis by about ½ length of terminal segment, last two segments with numerous outstanding hairs. A transverse row of 10–12 stiff bristles on underside of proboscis at base, and two small, dense, projecting tufts of hairs near base of each palp. Antenna without prominence on torus. About 3 long, narrow, pointed scales on segment 6; matted and twisted tufts on segments 7–9; 3 long scales on segment 10 which are expanded towards tips, but have hair-like terminations. Some rather short thick hairs on segments 10 and 11. *Hypopygium*: processes on subapical lobe of coxite very similar to those of *cinctellus*, but only 3 hairs near dorsal border of coxite in a row, instead of a large collection. Style expanded apically, but less so than in *cinctellus*.

LARVA.—Unknown.

HABITAT.—Ponds (*Leicester*).

DISTRIBUTION.—(Not recorded from India previously.) UPPER BURMA: Bhamo *, x. 1931 (*Feegrade*), 1 ♂. BENGAL: Calcutta, Matiabruz *, Garden Reach, x. 1931 (*Senior-White*), 1 ♂. SOUTH INDIA: Mudgere *, Kadur dist., Mysore, 1931 (*Anantaswami Rao*) 1 ♂.

Known also from MALAY PENINSULA, SIAM *, BORNEO, and SOUTH CHINA.

211. **Culex (Lophoceratomyia) fraudatrix** Theobald, 1905.

Ann. Mus. Nat. Hung iii, p. 94 (♂ & ♀). TYPE-LOC: Friedrich-Wilhelmshafen, and Stephansort, Astrolabe Bay, both New Guinea, 1900 (*Biró*). TYPE: ♂ & ♀ in Nat. Mus. Hung., Buda Pest.

Lophoceratomyia variata Leicester, 1908, Cul. Malaya, p. 121 (♂ & ♀) TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

(For further synonymy and varieties see Edwards 1932, p. 197.)

ADULT †.—Readily distinguished from other species of the subgenus by the large scale-tuft on segment 6 of ♂ antenna. Wing 2–3 mm.

♀.—*Head*: vertex and nape covered with dark brown narrow and upright scales, a very narrow pale border to eyes, widening out at sides. Antennæ, clypeus, palpi, and proboscis dark brown. Palpi about ⅛ length of proboscis. *Thorax*: mesonotal scales dark reddish-brown. Pleuræ brown, without scales, one lower mesepimeral bristle. *Wings*: dark scaled. *Legs*: dark brown, fore and mid-femora paler posteriorly, hind pair pale on both surfaces, but dark dorsally. *Abdomen*: dorsum dark brown, small basal lateral ochreous markings usually present; sternites pale brown. (In var. *annulatus* Taylor, from Australia, there are pale basal bands on dorsum.)

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† Theobald 1907, p. 474; Edwards 1913 *b*, p. 235 (syn.); 1922 *c*, p. 281 (*fraudator*); 1924, p. 396; Barraud 1924 *j*, p. 41 (*fraudator*).

♂.—Antennæ plumose; torus without a projection on inner side. Some long scales on segment 6, forming a dark tuft projecting outwards and slightly upwards; below these, projecting downwards, are some long hairs, which appear white from certain angles; smaller tufts of crumpled scales on segments 7 and 8, the usual matted tuft on 9, and a tuft of hairs and scales on 10 (fig. 87, **c**). Palpi longer than proboscis by 1½ times length of apical segment. Length of proboscis about 1·8 mm.; long segment of palp about 1·7 mm., each of last two segments about 0·3 mm.; the terminal segments with numerous outstanding hairs; a small finger-like process at base of each palp, and transverse row of about 6 rather long stiff bristles on underside of proboscis at base. Thorax, legs, and abdomen as in ♀, except that on the last the lateral pale markings are sometimes absent. *Hypopygium* (fig. 88, **a**, **m**): structure similar to that of *minutissimus* in some respects, but processes on subapical lobe of coxite of different form, and style widened towards tip.

LARVA *.—The following description of larvæ of *fraudatrix* from Singapore is taken from Edwards and Given:—

"*Head* large, considerably broader than long, mainly pale in colour, but with several dark spots on posterior part of clypeus, and also darkened round occiput. Clypeal spines moderately stout and straight. Tuft *A* large, plumose, with 7–12 branches; *B* and *C* both double, very long and reaching far beyond front of head; *C* placed obliquely behind *B*; *d* trifid, rather longer than usual. Antennæ fully as long as the head, rather strongly curved; a dark ring at the base and another immediately beyond the tuft, leaving the tip pale; shaft with strong spicules except on the slender terminal portion. Tuft very large, with 25–30 plumose branches, placed beyond two-thirds. Preapical bristles placed a short distance before the tip, both very long, about two-thirds as long as the shaft of the antenna; one of the terminal bristles also long, but shorter than the preapical pair. *Mentum* with a moderately large median tooth and 10–12 small teeth on each side, the outer one or two sometimes a little larger

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* Edwards & Given 1928, p. 351.

and more detached, but not conspicuously so. *Thorax* with the lateral tufts large, plumose, and set in small but distinct chitinous plates. Prothoracic hairs very long, extending forwards far beyond front of head. *Abdomen* with smooth skin; the lateral tufts mostly triple. Eighth segment with three rather large branched tufts; the upper pair 6-branched and plumose; the middle (subsiphonal) pair with 6–8 branches and very thickly plumose, the ends of the branches sometimes split into several twigs. Comb a patch of about 30 very small dark scales, not obviously fringed. *Anal segment* with the chitinous ring hardly longer than broad, almost smooth on the posterior margin; inner dorsal hair with two small branches from base; lateral hair small, with 3–4 branches. Brush with about 10–12 large many-branched tufts. *Siphon* long, brown, usually with a dark brown ring in the middle; index about 8–9; in shape slightly tapering on about the basal half, then almost parallel-sided, the tip very slightly widened. Three or four pairs of ventral or ventro-lateral tufts, which have usually 2–3 branches, the branches simple and hardly longer than the diameter of the siphon. Pecten of 10–12 rather slender teeth, which are fringed along one side with fine denticles, those at the base rather stronger, the last tooth at about one-third the length of the siphon.

HABITAT.—Pot-holes, etc., chiefly in mangrove tidal area, but also away from coast."

DISTRIBUTION.—ASSAM: Dibrugarh *, viii. 1922 (*Barraud*); Golaghat *, Sibsagar dist., xii. 1924 (*Barraud*). ANDAMAN IS.: Mount Harriet *, ix. 1911 (*Christophers*).

Also known from MALAY PENINSULA, PHILIPPINES, MALAY ARCHIPELAGO, AUSTRALIA, NEW GUINEA, and SOLOMON IS.

212. **Culex (Lophoceratomyia) minor** Leicester, 1908.

Cul. Malaya, p. 126 (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.†

var. n. *bengalensis* (see below). TYPE-LOC.: Nongpoh, Assam (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT ‡.—Very similar to *uniformis* and *mammilifer*, but distinguished from these in the ♂ sex as indicated in key.

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† There is some doubt regarding Leicester's type-specimens, as none could be found in his collection which agreed exactly with his description. Edwards (1917) re-defined the species, and I have followed this in describing the type-form. The variety referred to above may very possibly prove to be a distinct species. I have seen a few other specimens which differ slightly from the type-form and from var. *bengalensis*, and it is possible that these may be *C.* (*L.*) *bernardi*, described by Borel (1926, pp. 111–114) from Cochin China, but further material is required before a decision can be arrived at.

‡ Edwards 1917, p. 227; Barraud 1924*j*, p. 44; Borel 1926, p. 109.

No reliable differences can be given by which ♀♀ may be separated.

♂.—Palpi only very slightly longer than proboscis *; last two segments with very few hairs. Antenna with a small number of fairly short hair-like scales on segment 6, all about same length (fig. 87, **d**); no long dark expanded scales as in *uniformis* and *mammilifer*, but very similar matted and twisted tufts on segments 7–9, and some rather short thickened hairs on one side of segment 10. *Hypopygium* (fig. 88, **e**, **j**): coxite with the usual 3 rod-like processes on subapical lobe, all about same length, two with hooked tips, one ending in a thin upturned filament; also a leaflet, 2 curved bristles, and a curved sword-like process. A row of usually 7 recurved hairs, extending further up dorsal border of coxite than in *uniformis*. Style not elbowed, not expanded in middle, but gradually tapering. *lp*, in side view, less pointed than in *uniformis*, and with a smaller median process.

var. n. *bengalensis*.—Specialized hairs on segment 6 of antenna all very long, not scale-like, and with the basal part thickened. Palpi longer than proboscis by about length of last segment. These differences are correlated with a slight difference in the hypopygium, viz., a row of usually only 5 recurved hairs situated (as in *uniformis*), low down on dorsal border of coxite.

LARVA †.—Very similar to that of *fraudatrix*, but quite distinct from that of *uniformis*, the body-integument being smooth and not covered with minute hairs. Some larvæ thought to be of this species, collected in India, agree closely with the following notes taken from Edwards and Given:— "Structurally similar to *C. fraudatrix*, differing chiefly as follows:—Antennæ without dark ring at base, the narrow apical portion slightly and uniformly darkened; the longer apical bristle almost or quite as long as the preapical. Clypeal tuft *A* with about 8 branches. Siphon uniformly pale brownish and rather longer; index about 9–10; the basal third tapering, the outer two-thirds parallel-sided and very slender. Pecten with about 16 teeth, similar in form to those of *C. fraudatrix*, but the basal denticles somewhat stronger. Gills rather pointed, over twice as long as the anal plate.

"HABITAT.—The Singapore specimens were found in rock-pools in company with *Aëdes* (*Finlaya*) *saxicola* Edw. Other specimens in the British Museum were taken in old fallen bamboos at Ulu Gombak, F.M.S., by Dr. H. P. Hacker; these differ from the rock-pool specimens only in the darker siphon and stronger basal denticles to the pecten teeth; the adults are quite similar. Barraud records the larvæ from bamboos, rock-pools and tree-holes."

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* [In Indian specimens there is a small dense patch of minute hairs on each side of the proboscis near base, and a number of longer curved hairs laterally and on under surface of proboscis before middle. These hairs do not appear to be present in Malayan specimens.]

† Borel 1926, p. 110; Senior-White 1927, p. 71; Edwards & Given, 1928, p. 352.

DISTRIBUTION.—♂♂ of the type-form have been examined by the author from :—LOWER BURMA : Tenasserim, Victoria Point, and Mergui, all i. 1922 (*Sharma*). UPPER BURMA : Akyab, viii. 1924 (*Feegrade*).

[Further ♂♂, apparently of the type-form, are in the British Museum from NORTH KANARA, Karwar (*Cogill*), and BOMBAY DECCAN, Tavargatti, viii. 1921, from larvæ in tree-holes (*Barraud*).]

♂♂ of var. *bengalensis* :—ASSAM : Shillong, ix. 1917 (*Fletcher*) : Nongpoh, vii. 1922 (*Barraud*). NORTH BENGAL : Sukna, and Marianbarrie Tea Estate, viii. 1928 (*Sobha Ram*).

213. **Culex (Lophoceratomyia) plantaginis** Barraud, 1924.

Ind. Journ. Med. Res. xii, p. 46 (♂). TYPE-LOC. : Koti, near Kalka (Kalka-Simla road), Himalayan foothills. TYPE : ♂ in Brit. Mus.

ADULT.—Closely allied to *C.* (*L.*) *minor*, differing in the banded abdomen. Wing (♂) about 2·6 mm.

♂.—*Head* : vertex and nape covered with narrow pale scales and darker upright scales, a patch of creamy scales at each side, continued as a border to eyes, in front. Antennæ, palpi, and proboscis dark brown. Palpi longer than proboscis by a little more than length of apical segment; length of proboscis about 1·87 mm., of long segment of palp 1·6, penultimate segment 0·31, apical segment 0·32; the last two segments with a few outstanding hairs, more numerous on penultimate than on apical segment. Antenna very similar to that of *minor* (type-form). *Thorax* : scutum and scutellum covered with brown scales, lighter in colour than in *C.* (*L.*) *uniformis* and allied species. Pleuræ dark brown, coxæ lighter, 2–3 *ppn* bristles, one lower mesepimeral bristle. *Wings* : thinly clothed with dark scales. *Legs* : dark brown, lighter when seen from behind; femora paler beneath, as usual. *Abdomen* : tergites brownish-black, with narrow basal ochreous bands *. Sternites brown. *Hypopygium* :

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* In some specimens, apparently of this species, the pale bands on the abdomen are absent, or invisible owing to shrinkage. After examining a number of ♂♂ of this form, and of the type-forms of this species and *minor*, I am inclined to think that possibly they may all be forms of one species showing variation in markings, in the form of the scales on 6th segment of antenna, and in hypopygial details. Further work upon this difficult group of species is required.

(fig. 88, f, o): very similar to that of *minor* (type-form) but usually 8–9 hairs in the row along dorsal border of coxite. Of the 4 rod-like processes on the subapical lobe of coxite, the one nearest to the style is usually longer, more slender, and more curved.

LARVA.—Unknown.

HABITAT.—Pools (*Barraud*); cement water-channel in heavy sâl forest (*Senior-White*).

DISTRIBUTION.—WESTERN HIMALAYAN foothills: Koti *, type-locality, as given above. ORISSA: Gua *, Singhbhum dist., xi. 1929 (*Senior-White*). BOMBAY DECCAN: Tavargatti *, Belgaum dist., viii. 1921 (*Barraud*).

214. **Culex (Lophoceratomyia) uniformis** Theobald, 1905.

Journ. Bomb. Nat. Hist. Soc. xvi, p. 245 (♂ & ♀). TYPE-LOC.: Peradeniya, Ceylon (*Green*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Very similar to *C.* (*L.*) *minor* and *mammilifer* in the general blackish-brown colour, and no definite characters apparently exist by which the ♀♀ may be distinguished with certainty; there are, however, structural differences in the ♂♂, as given in key. Wing 2·5–3·2 mm.

♀ and ♂.—*Head*: bluish-white flat scales at sides, continued as a narrow border to eyes in front, remainder covered with narrow and upright brownish-black scales. Antennæ, palpi, and proboscis brownish-black. Antenna of ♂ (fig. 87, i) with a blunt prominence on inner side of torus, segment 6 with 7–8 scales of varying lengths, the tip of the longest reaching beyond the matted tuft on segment 9 (when the antenna is mounted flat); the usual matted and twisted tufts on segments 7–9; no scales on 10. Palpi of ♀ about ¼ length of proboscis (comparatively slightly longer than in allied species). Palpi of ♂ longer than proboscis by rather more than length of apical segment, last two segments distinctly hairy and rather longer than corresponding segments in *minor* and *mammilifer*. Length of proboscis 1·7 mm., long segment of palp 1·5, penultimate segment 0·31, apical 0·34 mm. No spines or processes at base of proboscis or palpi. *Thorax*: mesonotum covered with narrow brownish-black scales. Pleuræ dark green or dark brown, without any conspicuous markings or scales; 3–4 *ppn* bristles; one lower mesepimeral bristle usually present. *Legs*: deep brown, femora paler beneath, as usual. *Abdomen*: tergites entirely covered with brownish-black scales; venter somewhat paler. ♂ *hypopygium* (fig. 88, **h**, **n**): coxite with 3 rod-like processes on subapical lobe, two with hooked tips and one shorter and straight, also a leaflet and 2 bristles; dorsal border with usually only 4 hairs in a row, low down and some distance below subapical lobe. Style slightly elbowed and very little expanded in middle, tapering from this part to tip. *lp* with a number of small teeth and rather large pointed median process.

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† Barraud 1924 *j*, p. 43.

LARVA *.—Differs from other known larvæ of the subgenus in having the integument of the body thickly covered with very small bristle-like hairs. *Antenna* of moderate length, with fine spinelets on shaft, tuft at about ¾ from base; 2 long preapical spines and one much smaller. *Frontal hairs A*, *B*, and *C* with subplumose branches, the number of branches being respectively 6–11, 3–6, and 2–4. Hair *d* unusually long and stout, reaching nearly to front of clypeus. Preclypeal spines strong and dark, in several specimens with small accessory spines projecting from sides. Mentum with large central tooth and 8–10 smaller teeth either side. Some long, single, unbranched, as well as usual branched, hairs on thorax. *Abdomen* with fairly long 3–5-branched hairs. Comb of 35–45 narrow fringed teeth in triangular patch. Three branched hairs and two single hairs posterior to comb on segment VIII, the former with 3–6 branches. *Siphon* widest at base and slightly tapering to tip, about 8–9 times length of diameter at base. Four subposterior pairs of hairs, with 4–5 rather long fine branches, evenly spaced between pecten and apex of tube. Pecten of 13–18 teeth, each with 3–4 sharp lateral denticles. *Anal segment* with numerous long thin spines on and near posterior margin, between fan-plate and subdorsal hairs; *lh* fine and unbranched. About 12 fan-hairs of moderate length, each divided into a number of branches: *osc* single, *isc* of 2–3 branches of different lengths. Both pairs of papillæ pointed and about length of chitinised part of segment.

HABITAT.—Tree-holes and rock-pools.

DISTRIBUTION.—Common from BOMBAY down WEST COAST to CEYLON. There are, so far, no records from other parts of the Indian region, or from other countires.

215. **Culex (Lophoceratomyia) mammilifer** Leicester, 1908.

Cul. Malaya, p. 128 (♂ & ♀). TYPE-LOC.: Raub, near Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

Lophoceratomyia bicornuta Theobald, 1910, Rec. Ind. Mus. iv, p. 25 (♂). TYPE-LOC.: Dawna Hills (base), near Kawkareik, Lower Burma, iii. 1908 (*Annandale*). TYPE: ♂ in Ind. Mus.

ADULT †.—Very similar to *C.* (*L.*) *uniformis* and *minor*, but mesonotal scaling in both sexes deep reddish-brown rather than brownish-black. There are also differences in the ♂♂ in structure of hypopygia and in scale-tufts on antennæ.

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* Senior-White 1927, pl. x; Edwards 1928 *a*, p. 276.

† Edwards 1913 *b*, p. 236 (syn.); Barraud 1924 *j*, p. 43.

♂.—Antenna with blunt prominence on inner side of torus; segment 6 with about 9 conspicuous scales of varying lengths, the longest reaching to matted tuft on segment 9 (when antenna is mounted flat), also some hairs with expanded bases and long fine points. In dried specimens this collection of scales is rather more conspicuous than in *uniformis*. The usual twisted and matted tufts on segments 7–9, and a tuft of fairly short hairs on 10, some slightly expanded on basal ½. Palpi longer than proboscis by a little less than length of apical segment; the last two segments short and subequal and with few outstanding hairs; a row of small, dark, stiff bristles on outer side of each palp near base (not present in *uniformis* or *minor*). Length of proboscis about 1·8 mm., of long segment of palp 1·5, penultimate 0·22, apical 0·20 mm. *Hypopygium* (fig. 88, c, l): parts of diagnostic importance shown in figures. The presence of a long curved spine on subapical lobe of coxite should be noted, also form of style and presence of hairs, forming a crest, near tip.

LARVA †.—This has not been isolated in India. The following note is taken from Edwards:—" This species was reared by Dr. A. T. Stanton at Ginting Simpah, Federated Malay States. One larval skin is in the British Museum collection. This resembles *C. minor* very closely; the siphon is a little longer and more slender still, index about 10·5; anal gills shorter, not much longer than the plate."

HABITAT.—Pools in jungle (*Leicester*): rock-pools (*Senior-White*).

DISTRIBUTION.—BURMA: type-locality, as given above. NORTH BENGAL: Sukna *, Darjeeling dist., 500′, viii. 1928 (*Sobha Ram*). ANDAMAN IS.: Mount Harriet *, ix. 1911 (*Christophers*), and vii. 1926 (*Covell*). MALABAR COAST: Pudupadi *, x. 1915 (*Khazan Chand*). CEYLON: Suduganga, Matale dist., x. 1919 (*Senior-White*).

Known also from MALAY PENINSULA and BORNEO.

216. **Culex (Lophoceratomyia) flavicornis** Barraud, 1924.

Ind. Journ. Med. Res. xii, p. 45 (♂ & ♀). TYPE-LOC.: Nilgiri Hills, x. 1915 (*Khazan Chand*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Rather larger than the other species. Wing (♂) 3·5 mm., (♀) 4·3 mm. Distinguished by unusual hairiness of ♂ palpi.

♀ and ♂.—*Head*: both the narrow and flat scales on vertex and sides creamy-white, upright scales and bristles dark. Proboscis and palpi very dark brown. Palpi of ♀ ⅕–¼ length

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† Edwards 1928 *a*, p. 276.

of proboscis; those of ♂ longer than proboscis by a little less than length of rather long apical segment; proboscis about 2·4 mm. long: long segment of palp 2 mm., penultimate segment 0·27 and apical segment 0·62 mm., long segment with numerous hairs of moderate length along underside for whole length, last two segments with a number of short hairs. Antenna of ♂ (fig. 87, **h**) with blunt prominence on inner side of torus, segment 6 with tuft of long yellow hairs, tufts of crumpled scales and twisted hairs on segments 7, 8, and 9, very similar to those of several other species; a small tuft of straight hairs on segment 10. No bristles or processes at base of proboscis or palpi. *Thorax*: mesonotal scales dark chestnut-brown; scutellar scales very narrow and lighter brown; mesonotal and scutellar bristles dark. Pleuræ dark brown, without scales: 4 *ppn* bristles, one lower mesepimeral bristle (apparently sometimes absent). *Legs*: deep brown; femora paler beneath, as usual. *Abdomen*: dorsum dark brown, venter ochreous. ♂ *hypopygium* (fig. 88, **b**): subapical lobe of coxite with a leaflet, 3 long curved or sinuous spines, and a thick clubbed process. Style expanded apically and square-ended.

LARVA.—Unknown.

DISTRIBUTION.—SOUTH INDIA: Nilgiri Hills *, type-locality, as given above: Kodaikanal *, Palni Hills, 7,000′, ix. 1929 (*Fletcher*).

Subgenus CULICIOMYIA Theobald, 1907.

M.C. iv, p. 227. Genotype, *C. fragilis* Ludl. (as *C. inornata* Theo.)

Trichorhynchus Theobald, 1905 (nec Balbiani), Journ. Bomb. Nat. Hist. Soc. xvi, p. 240. Genotype, *C. fragilis* Ludl. (as *T. fuscus* Theo.).

Neomelanconion Theobald, 1907 (nec Newstead), M.C. iv, p. 514. Genotype, *C. nebulosus* Theo (as *N. rima* Theo., ♂).

Pectinopalpus Theobald, 1910, M.C. v, p. 416. Genotype, *C. nebulosus* Theo. (as *P. fuscus* Theo.).

Trichorhynchomyia Brunetti, 1912, Rec. Ind. Mus. iv, p. 477, nom. nov. for *Trichorhynchus*.

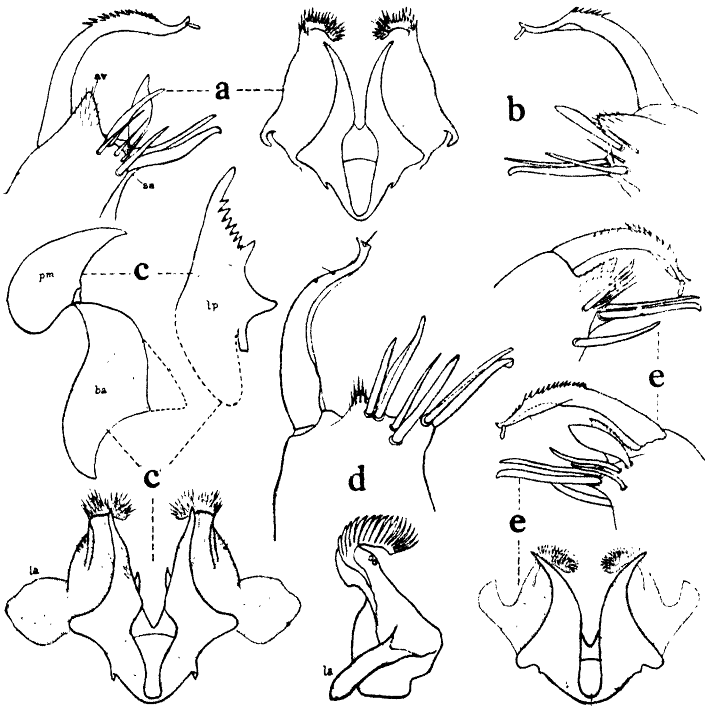
ADULT.—Mosquitoes of moderate size. Head with flat scales at sides, and with a row of small flat scales along eye-margins, usually forming a continuous border: other head-scales narrow and upright. Mesonotal scales narrow and dense, giving the thorax a characteristic smooth appearance in most species. Scutellar scales narrow. Tarsi and wing-scales dark. Pleuræ without scales, but with dark markings in those species in which abdomen is marked with pale bands. Usually one lower mesepimeral bristle. Palpi of ♂ longer than proboscis: the long segment with a row of peculiar translucent scales projecting downwards. Antenna of ♂ without scale-tufts. Coxite of ♂ hypopygium without scales;

usually with an apico-ventral hairy lobe, also a subapical lobe carrying several spines and usually a leaflet. Style usually with spiny crest. Phallosome divided into two pointed plates, with a row of small teeth. Paraprocts with spines or hairs at crown, and lateral arm variously developed.

Bucco-pharyngeal armature of ♀ with usually two rows of small sharp teeth.

Larva.—Very similar to those of subgenus *Culex*.

Fig. 89.



♂ hypopygial structures (tip of coxite, proctiger, and phallosome) of *Culex*, subgenus *Culiciomyia*: **a**, *pallidothorax*; **b**, *shebbearei*; **c**, *viridiventer*; **d**, *bailyi* (phallosome not shown); **e**, *nigrosignatus*. *av*, apico-ventral lobe of coxite. Other lettering as on p. 4.

Distribution and Bionomics.—This subgenus is represented in most parts of India, several species being common. Of nine Oriental species, seven are found in India. The remaining five known species are confined to Africa. Breeding-habits vary with the species; the larvæ of several live in tree-holes, of others in stream-pools, domestic collections of water, rice-fields, etc. The adult ♀♀ do not appear to attack man to any extent.

Key to Adults.

1. Abdomen with transverse pale bands on dorsum; integument of pleuræ with dark markings .... 2.
   Abdomen entirely dark on dorsum; pleuræ uniform in colour .... 6.
2. Pleuræ pale, with a distinct black spot on upper part of mesepimeron .... *nigropunctatus*, p. 383.
   Pleuræ with a brown stripe across upper part, and sometimes another dark area on sternopleura; no distinct isolated black spot on mesepimeron .... 3.
3. Mesonotal scales deep brown; palpi of ♂ with only a few hairs on last two segments .... 4.
   Mesonotal scales brown or fawn in colour; palpi of ♂ with numerous hairs on last two segments .... 5.
4. Abdominal pale bands usually subtriangular; fork-cells in wing of ♀ long, 3 times length of stems; basal arm of ♂ paraproct very large and bag-like (fig. 289, **c**) . *viridiventer*, p. 378.
   Abdominal pale bands straight; fork-cells in wing of ♀ shorter, not more than 2½ times length of stems; basal arm of ♂ paraproct quite small (fig. 89, **b**) .... *shebbearei*, p. 380.
5. Mesonotal scales dark fawn in colour; a dark area on sternopleura, as well as dark stripe across upper part of pleuræ; style of ♂ with spiny crest (fig. 89, **a**) .... *pallidothorax*, p. 381.
   Mesonotal scales brown; no distinct dark area on sternopleura, but a dark stripe across upper part of pleuræ; style of ♂ without obvious spiny crest (fig. 89, **d**) .. *bailyi*, p. 382.
6. Plume series of wing-scales broader (about 5 times length of greatest width); penultimate segment of ♂ palpi only about twice as long as labella .... *fragilis*, p. 385.
   Plume series of wing-scales narrower (about 10 times length of greatest width); penultimate segment of ♂ palpi fully 3 times as long as labella .... *bahri*, p. 386.

217. **Culex (Culiciomyia) viridiventer** Giles, 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 609 (May). (♀). TYPE-LOC.: Naini Tal, U.P., 4,000′ (*Giles*). TYPE: ♀ in Brit. Mus.

Culex angulatus Theobald, 1901 (November), M.C. ii, p. 324 (♀). TYPE-LOC.: as above. TYPE: ♀ in Brit. Mus.

Culex longifurcatus Theobald, 1910 (nec Becker), Rec. Ind. Mus. iv, p. 19 (♂ & ♀). TYPE-LOC.: Dahawangahary Hills, near Bengal Frontier, Nepal, ii. 1908 (*Butchu*). TYPE: ♂ & ♀ in Ind. Mus.

Culex pseudolongifurcatus Theobald, 1910, M.C. v, p. 366, nom. nov. for *C. longifurcatus* (name preocc.).

ADULT *.—Size rather large. Wing 4–5 mm.

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* Edwards 1913 *b*, p. 235 (syn.); Barraud 1924 *i*, p. 18; Borel 1926, p. 106.

♀.—*Head*: a patch of flat white scales at each side usually visible from above; the flat scales continued dorsally as a narrow border to eyes; narrow pale ochreous and dark upright scales on vertex, upright scales more numerous on nape. Palpi and proboscis black; palpi about $\frac{1}{6}$ length of proboscis. *Thorax*: mesonotum covered with deep brown narrow scales, giving it a smooth, dull, velvety appearance; usually some pale scales either side of antescutellar space; bristles dark, most numerous over wing-roots. Scutellar scales narrow and pale ochreous. Pleuræ usually pale green and without scales; a dark stripe from *ppn* to upper part of mesepimeron, and another dark area on sternopleura; 4–5 *ppn* bristles, one lower mesepimeral. *Wings*: outstanding (plume) scales long and narrow; fork-cells long, each about 3 times length of stem. *Legs*: black when seen from front or from above; sometimes with deep bluish lustre, pale brown when seen from behind; hind femur white except dorsally, and with pale knee-spot; a narrow pale ring also at tibio-tarsal joint. *Abdomen*: tergites black, with well-defined basal pale bands which are usually produced triangularly in middle, but this is not very marked in some specimens. Sternites pale green or pale ochreous.

♂.—Palpi longer than proboscis by a little less than length of apical segment; long segment with a row of long, pointed, translucent scales projecting downwards; last two segments with few outstanding dark hairs. Proboscis about 2–3 mm. long, segments of palp of following lengths, respectively: 1·65, 0·34, and 0·48 mm. Fork-cells of wing about twice length of stems. Markings as in ♀. *Hypopygium* (fig. 89, **c**): form of paraproct distinctive, the lateral arm being very much enlarged.

LARVA *.—*Antenna* long (about 0·8–0·9 mm.) and about $\frac{4}{5}$ length of head; shaft with fine spicules, most numerous on basal $\frac{1}{2}$; fan-shaped hair-tuft slightly nearer base than apex; preapical spines some little distance from tip of shaft; apical $\frac{1}{2}$ of shaft sometimes darkened, but not always. *Frontal hair A* with 5–7 branches; *B* and *C* with 2–3 long branches (in one specimen *C* is 4-branched); *d* fine, single, and fairly long. Preclypeal spines long and slender. Mouth-brushes moderately large, hairs simple. Mentum subtriangular, about 15 teeth either side of central one. *Thorax*: prothorax with some long single and 2-branched hairs dorsally. Lateral and subventral branched hairs on meso- and metathorax moderately developed. *Comb* of about 40 fairly long fringed teeth in a triangular patch.

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* Borel 1926, p. 107.

Siphon about 2·3 mm. long and about 6 times length of diameter at base, slightly tapering from near base to apex (not swollen at about middle as in *pallidothorax*). Pecten of 14–18 teeth, each with 5–7 fairly large lateral denticles along one side from base to apex. Four pairs of subposterior hairs along siphon between pecten and apex, each of 2–3 fairly long branches. *Anal segment* with some strong spines on posterior margin towards dorsum. Both *osc* and *isc* single and long: *lh* fine, single, moderately long. Fan small, 8–10 hairs, each divided into several fairly short branches, arising from fan-plate. Papillæ very long and bluntly pointed; dorsal pair sometimes nearly 4 times length of anal segment.

HABITAT.—Tree-holes, garden water-tanks, and butts.

DISTRIBUTION.—Common in WESTERN HIMALAYAS from western boundary of Nepal to Kashmir, 5,000′ to over 8,000′. I am in doubt as to records from other parts, and have not seen any typical specimens from Assam, South India or Ceylon. Examples from Ceylon previously identified as this species proved to be *C.* (*C.*) *shebbearei*.

218. **Culex (Culiciomyia) shebbearei** Barraud, 1924.

Ind. Journ. Med. Res. xii, p. 19 (♂ & ♀). TYPE-LOC.: Kurseong, Darjeeling dist., E. Himalayas, ix. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Resembles *C.* (*C.*) *viridiventer* and *pallidothorax* fairly closely, but is rather smaller. Wing 3·3–3·6 mm. From the former it differs chiefly in structure of ♂ hypopygium, in venation of ♀ wings, and in shape of pale abdominal bands, which are not triangularly produced in middle. Fork-cells 2–2½ times length of stems. Basal arm of ♂ paraproct quite small compared with that of *viridiventer*. From *pallidothorax* this species differs in colour of head-scaling, the narrow scales on vertex being white or very light in colour instead of brown. Palpi of ♂ with only few outstanding hairs on last two segments. Mesonotal scales deep brown, as in *viridiventer*. Subapical lobe of coxite without a leaflet which is present in *pallidothorax*. Style with only a short crest of spines towards apex (fig. 89, **b**).

LARVA.—Very similar to *viridiventer*. One skin definitely identified as this species by examination of hypopygium of ♂ which resulted apparently differs only in length of siphon, which is 1·4 mm. long. The siphonal hairs and majority of clypeal hairs are missing from this specimen.

HABITAT.—Tree-holes (India); large pitcher-plant, *Nepenthes rajah* (Borneo).

DISTRIBUTION.—EASTERN HIMALAYAS: Kurseong *, type-locality, as given above. WESTERN HIMALAYAS: Simla *, ix. 1915 (*Christophers*), and ix. 1930 (*Barraud*).

One ♂ from Suduganga *, Matale dist., CEYLON, ix. 1919 (*Senior-White*), appears to be this species.

Also recorded from NORTH BORNEO (*Pendlebury*) †.

219. **Culex (Culiciomyia) pallidothorax** Theobald, 1905.

Journ. Econ. Biol. i, p. 32 (*Culex*) (♂ & ♀). TYPE-LOC.: India (*James*). TYPE: ♂ & ♀ in Brit. Mus.

Culex albopleura Theobald, 1907, M.C. iv, p. 456 (♀). TYPE-LOC.: India (*Christophers*). TYPE: ♀ in Brit. Mus.

Culiciomyia annuloabdominalis Theobald, 1910, M.C. v, p. 236 (♂ & ♀). TYPE-LOC.: Peradeniya and Hakgala, Ceylon, 1907 (*Green*). TYPES: non-existent.

ADULT ‡.—Size moderate. Wing 3·5–4·5 mm.

♀.—Resembles *C.* (*C.*) *viridiventer* and *shebbearei* in general appearance, but differs as follows:—Head-scaling darker, the narrow scales brown instead of creamy. Scales covering mesonotum dark fawn-brown instead of deep dark brown. Anterior fork-cell of wing about 2¼ times length of stem. Hind femur without a distinct pale knee-spot dorsally. Pale basal bands on abdomen straight or slightly rounded on posterior margins.

♂.—Palpi longer than proboscis by about length of fairly long terminal segment, last two segments with numerous outstanding hairs. *Hypopygium* (fig. 89, **a**): differs from that of *viridiventer* in the much smaller basal arm of paraproct, and from *shebbearei* in the longer spiny crest on style and presence of a leaflet on subapical lobe of coxite.

LARVA §.—Resembles that of *viridiventer* in most details, but differs as follows:—*Siphon* somewhat swollen, widest at about ⅓ of distance from base, and tapering from this part to apex, which is rather narrow; length about 5 times that of diameter at base, and about 3·6 times that of greatest width. Pecten of only about 5–8 teeth, usually commencing some little distance from base of siphon. Four pairs of subposterior hair-tufts, each of 4–5 fine short branches; the two most distal pairs often fairly close together and some distance from the two more proximal pairs, but position of individual tufts varies, as in other species.

HABITAT.—Tree-holes, bamboos, shallow wells, stream and rock-pools, swampy ground-pools, sometimes in foul water.

DISTRIBUTION.—Common in the Indian region, both in the hills and plains, from the PUNJAB to ASSAM and BURMA, and southwards to CEYLON.

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† Edwards 1931, p. 28.

‡ Theobald 1907, p. 446; Edwards 1913 *b*, p. 235 (syn.); Barraud 1924 *i*, p. 20; Borel 1926, p. 104.

§ Borel 1926, p. 105; Senior-White 1927, p. 71.

Known also from MALAY PENINSULA, SIAM, COCHIN CHINA, SOUTH CHINA, and as far east as HALMAHEIRA ISLAND, east of Celebes.

220. **Culex (Culiciomyia) bailyi,** sp. n.

TYPE-LOC.: Virajpet, Coorg, South India, vi. 1927 (*Baily*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT.—Resembles *C.* (*C.*) *pallidothorax*, differing chiefly in ♂ hypopygium. Wing 3·3–3·6 mm.

♀.—*Head*: vertex and nape covered with narrow yellowish and dark brownish upright scales; broad dark brown scales on either side towards front, and a patch of greyish-white flat scales each side laterally, these pale scales continued dorsally as a narrow border to eyes to middle point. Tori pale brown; clypeus, palpi, and proboscis dark brown. Palpi about ⅕ length of proboscis. *Thorax*: mesonotum curved, with brown narrow scales, somewhat darker than in *pallidothorax*, but less dark than in *viridiventer* and *shebbearei*; bristles dark. Scutellar scales similar to those on mesonotum. Postnotum and pleuræ pale greyish or greenish, except upper part of latter, where colour is darker and brownish from *ppn* to beneath wing-root. *Wings*: fork-cells about twice length of stems. *Legs*: dark brown; fore and mid-femora extensively pale posteriorly; hind femur pale on both sides, except dorsally. *Abdomen*: tergites brownish-black, with well-marked or pale ochreous bands on III–VII: VIII also pale scaled; posterior margins of pale bands almost straight.

♂.—Coloration and markings as in ♀. Palpi longer than proboscis by about length of last segment; last two segments with numerous outstanding dark hairs; long segment with about 8 long, pointed scales on apical ½, directed downwards. *Hypopygium* (fig. 89, **d**): style wide on apical ⅓, then tapering: terminal part narrowed for short distance; tip truncated, with terminal appendage as usual; no obvious spiny crest (differing from other species in this respect). Apico-ventral lobe of coxite not prominent, carrying a leaflet, a shorter straight sword-like process, and a strong bristle. Subapical lobe with two rod-like processes as usual; one very strong, tapering, with truncated tip, the other pointed; also a shorter, strong, bluntly-pointed spine and 4–5 fairly strong bristles. *lp* with one large tooth towards base and a row of much smaller teeth above; latter have a similar arrangement to those of *pallidothorax*, but appear to be smaller.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

221. **Culex (Culiciomyia) nigropunctatus** Edwards, 1926*.

Bull. Ent. Res. xvii, p. 121 (nom. nov. for *annulata* Theo., preoccupied).

Culiciomyia annulata Theobald (nec *Culex annulatus* Schrank), 1907, M.C. iv, p. 230 (♂ & ♀). TYPE-LOC. : Kuching, Sarawak, in house (*Barker*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—A small brown species, which may be distinguished by presence of a very distinct velvety-black spot on mesepimeron. Wing about 3–3·6 mm.

♀.—*Head* : a patch of flat white scales at sides, continued dorsally as a rather broad and irregular border to eyes nearly to middle point ; vertex covered with narrow pale ochreous scales and darker upright scales. Proboscis and palpi brown, latter about $\frac{1}{6}$ length of proboscis. *Thorax* : mesonotal scales dark fawn-brown ; scutellar scales lighter. Pleuræ pale brown, with a very distinct velvety-black (not brown) spot on upper part of mesepimeron and two less distinct dark areas, one posterior to *ppn* and one in middle of sternopleura ; one lower mesepimeral bristle. *Legs* : brown anteriorly, hind femur pale except dorsally ; all legs, when viewed from behind, pale brown or yellow. *Abdomen* : tergites brown, with narrow pale ochreous basal bands, and with usually a thin line of pale scales along apical margins of tergites. Sternites pale ochreous.

♂.—Palpi longer than proboscis by a little more than length of last segment, last two segments with a number of outstanding hairs ; long segment with a row of very long, pointed, translucent scales on apical $\frac{1}{3}$, projecting downwards : a collection of moderately long hairs projecting downwards from middle of proboscis. Pale basal abdominal bands usually wider than in ♀, otherwise markings are very similar. *Hypopygium* (fig. 89, e) : apico-ventral lobe of coxite with 2 large processes and 3 smaller bristles ; subapical lobe with 2 rod-like spines, 2 smaller processes, and a leaflet. Style with spiny crest on apical $\frac{1}{2}$, continued nearly to tip. Basal arm of paraproct wide and fairly short.

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* This species has been referred to previously as *Culex* (*Culiciomyia*) *pullus*, originally described by Theobald as *Culex pullus* from New Guinea (Ann. Mus. Nat. Hung. iii, p. 87, 1905). This was later considered to be synonymous with *Culiciomyia annulata* Theobald, but in 1926 Edwards considered that the Oriental form was distinct from that found in New Guinea, and introduced the name *nigropunctatus* for the former (the name *annulata* being preoccupied). The adults of *nigropunctatus* differ from *C.* (*C.*) *pullus*, as now restricted, in having a black (not brown) spot on the mesepimeron. I have seen adults of both sexes from the Philippines, and these appear to be identical with Indian specimens in markings and in structure of ♂ hypopygium.

[LARVA †.—Differs from all other known larvæ of Indian Culicine mosquitoes in the false-jointed siphon-tube. *Antenna* of usual form, slightly and uniformly darkened ; two hairs about ½ length of antenna slightly removed from tip (about ¾ or ⅘ of distance from tuft to tip). *Frontal hairs A*, *B*, and *C* with 6–8, 3–4, and 3 branches respectively : *B* and *C* reaching much beyond front edge of clypeus ; *C* internal and only slightly posterior to *B* ; *d* small and single or bifid. Preclypeal spines long, slender, curved, and pale. Mentum with 12–15 teeth on each side of median tooth. *Thorax* without special structures ; meso- and metapleural tubercles without distinct spines, one of the long hairs in each of these groups with 6–8 branches. *Abdomen* with dorso-lateral hair on I and lateral hair on II 3-branched ; lateral hairs on III–VI long and single. Comb of about 40 long, narrow, fringed teeth in a triangular patch. Dorso-lateral and subsiphonal tufts of VIII each of 6–8 plumose branches, subsiphonal tuft considerably the larger. *Siphon* 2–2·4 mm. long and about 9–10 times as long as its diameter at base, gradually tapering from base to tip. At about ⅗ or ⅔ length of tube from base is an unchitinised ring, wider anteriorly, narrow posteriorly, forming a false joint from which distal ⅓ of siphon is readily bent forwards ‡. Pecten of 9–11 teeth, last few widely spaced, all similar in form, wide at base, with denticles extending along one side nearly to tip. Only three pairs of fine single or bifid hairs, all lateral in position, and scarcely longer than diameter of tube, one beyond end of pecten, one immediately before the false joint, and the third at middle of distal part of tube. *Anal segment* ringed as usual, posterior margin of ring with fine spicules on upper ½. Both *osc* and *isc* long and single ; *lh* also single, slightly longer than ring. Papillæ almost 3 times as long as ring, pointed.]

HABITAT.—Rice-fields (*Barraud*) ; pools (*MacDougall*).

DISTRIBUTION.—EAST BENGAL : Chittagong * and Rangamati *, Chittagong Hill Tracts, viii. 1922 (*Barraud*). ASSAM :

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† [A brief description of a larva supposed to be this species was given by Edwards (1926, p. 121). At the suggestion of the author the material in the British Museum has been re-examined, and it appears certain that the larvæ described as *nigropunctatus* were wrongly labelled ; they are probably skins of *C. vishnui*. Other larval skins from Singapore were evidently correctly labelled, as they agree in all respects with a larva determined by Barraud as this species from Chittagong Hill Tracts, Eastern Bengal. The above description has been drawn up from these specimens.]

‡ [The extent of the area in which chitinisation is lacking is almost exactly the same in all skins examined (two from Singapore, two from Eastern Bengal, eight from Ceylon).]

Nongpoh *, Khasi Hills dist., and Dinapur *, Naga Hills dist., viii. 1922 (*Barraud*); Golaghat *, Sibsagar dist., x. 1924 (*Barraud*). NORTH MADRAS Coast: Vizagapatam *, ii. 1928 (*Puri*). MYSORE: Mudgere *, Kadur dist. (*Anantaswami Rao*). CEYLON: Colombo * (*James*); Galle Face Battery, Colombo, x. 1909 (*MacDougall*).

Also known from MALAY PENINSULA, BORNEO, PHILIPPINES (see footnote on previous page), and CELEBES (Mamoedjoe, *Dr. Erber*).

222. **Culex (Culiciomyia) fragilis** Ludlow, 1903.

Journ. N.Y. Ent. Soc. xi, p. 142 (♂ & ♀). TYPE-LOC.: Oras, Samar, Philippine Is. TYPE: ♂ & ♀ in U.S. Nat. Mus.

Trichorhynchus fuscus Theobald, 1905, Journ. Bomb. Nat. Hist. Soc. xvi, p. 242 (♀). TYPE-LOC.: Peradeniya, Ceylon, xii. 1901 (*Green*). TYPE: ♀ in Brit. Mus.

Culiciomyia inornata Theobald, 1907, M.C. iv, p. 227 (♂ & ♀). TYPE-LOC.: Kuching, Sarawak, Borneo (*Barker*). TYPE: ♂ & ♀ in Brit. Mus.

Culiciomyia ceylonica Theobald, 1907, M.C. iv, p. 236 (♂ & ♀). TYPE-LOC.: Peradeniya and Maskeliya, Ceylon (*Green*). TYPE: ♂ & ♀ in Brit. Mus.

? *Culex graminis* Leicester, 1908, Cul. Malaya, p. 158 (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPES: non-existent.

ADULT †.—Differs from other Indian species, with the exception of *C.* (*C.*) *bahri*, in absence of pale bands on abdomen and of dark markings on pleuræ. Outstanding (plume) scales on wings broader than in any other species. Wing about 3–3·6 mm.

♀.—*Head* and appendages similar to *viridiventer*. *Thorax*: mesonotal scales deep brown; pleuræ usually of a uniform greenish colour, without dark markings. *Wings*: outstanding plume-scales about 5 times length of greatest width, instead of a more usual measurement of 10 times. *Legs*: dark brown, femora paler beneath, as usual, but without pale knee-spots. *Abdomen*: dorsum brownish-black, venter paler.

♂.—Palpi longer than proboscis by about length of last segment; penultimate segment about twice length of labella; last two segments with a moderate number of outstanding hairs. Other details as in ♀. *Hypopygium*: very similar to that of *nigropunctatus*, but basal arm of proctiger narrower, spiny crest upon style rather longer, and apico-ventral lobe less prominent.

LARVA.—Unknown.

HABITAT.—Tree-holes (*Barraud*).

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† Edwards 1914 *b*, p. 79 (syn.); 1929 *a*, p. 4; Barraud 1924 *i*, p. 21; Dyar & Shannon 1925, p. 85 (note on syn.).

DISTRIBUTION.—NORTH KANARA: Kadra *, ix. 1921 (*Barraud*). ASSAM: Nongpoh *, Khasi Hills dist., vii. 1922 (*Barraud*). CEYLON: type-localities, as given above; Colombo, 1913 (*James*).

Recorded also from MALAY PENINSULA, PHILIPPINES, and BORNEO.

223. Culex (Culiciomyia) bahri Edwards, 1914.

Bull. Ent. Res. v, p. 79 (♂ & ♀). TYPE-LOC.: Badulla, Ceylon (*Bahr*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Very similar to *C.* (*C.*) *fragilis*, but differs as indicated in key and in having fewer flat white scales along eye-margins, a more rounded coxite to ♂ hypopygium, and a shorter basal arm to proctiger. The following is a copy of the original description:—

"*Head* clothed with black upright forked scales and yellowish narrow curved scales in the middle: flat scales at the sides, which are white below and purplish-black above, the white ones, however, extending upwards along the eye-margins towards the middle line, but they do not, as in other members of the genus, quite reach the middle. Basal joint of antennæ blackish, without scales. Palpi and proboscis black-scaled. In the male the palpi are longer than the proboscis by a little more than the length of the last joint, the penultimate joint is only a little shorter than the terminal, and about three times as long as the labella: the projecting scales on the basal joints are much fewer, shorter and more difficult to see than in any other member of the genus. *Thorax* with the usual dull (matt) greyish-brown integument, clothed with small, narrow, dark brown scales, lighter on the scutellum. Pleuræ pale, unscaled, without any dark markings. *Abdomen* clothed with blackish-brown scales above, whitish ones below; no trace of white lateral spots at the bases of the segments, but a few paler scales at the apical corners. Male genitalia with spiny claspers and with the second plate of the harpagones long, pointed, and serrated below, as in all other species of the genus. *Legs* entirely dark-scaled except for the undersides of the femora and the lateral aspect of the hind pair. *Wings* with dark brown scales; the lateral vein-scales towards the apex of the wing are linear. Fork-cells rather long, the upper one about twice as long as its stem, and with its base a little nearer the base of the wing than that of the lower.

"Ceylon: Badulla (*Dr. P. H. Bahr*), a series bred from larvæ, 3 ♂ (including type), 4 ♀, in the British Museum; other specimens in the London School of Tropical Medicine, 1 ♀, Hakgala, and 1 ♀, Peradeniya (*E. E. Green*).

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† Barraud 1924 *i*, p. 21.

"The specimens were all at first thought to be *C. fragilis* Ludlow, but there are abundant distinctions between the two, *C. bahri* having narrower lateral vein-scales, fewer flat white scales on the orbital margins, fewer outstanding scales, and a longer penultimate joint to the male palpi, and in the genitalia more rounded side-pieces and a shorter basal projection on the harpagones."

LARVA.—Unknown *.

DISTRIBUTION.—CEYLON : Badulla, type-locality, as given above, Hakgala, and Peradeniya (*Green*).

Specimens apparently of this species are in the British Museum from JAVA (Djajasana, *Brug*).

Subgenus **CULEX** Linnæus, 1758.

Syst. Nat. ed. x, p. 602. Genotype, *C. pipiens* Linn.

Leucomyia Theobald, 1907, M.C. iv, p. 372. Genotype, *C. gelidus* Theo.

Oculeomyia Theobald, 1907, M.C. iv, p. 515. Genotype, *C. bitæniorhynchus* Giles (as *O. sarawaki* Theo.).

Theobaldiomyia Brunetti, 1912, Rec. Ind. Mus. iv, p. 462 (nom. nov. for *Leucomyia* Theo.).

(For further synonymy *vide* Edwards 1932, p. 200.)

ADULT.—Moderate-sized to rather small mosquitoes. Head with upright and narrow scales on vertex, flat scales at sides, but no border of flat scales round eye-margins in front. Scutellar scales narrow. Ornamentation rather varied. Palpi of ♂ always longer than proboscis, with last two segments upcurved and hairy ; long segment without the erect translucent scales which characterize *Culiciomyia*. Antenna of ♂ without scale-tufts. Coxite of ♂ hypopygium without scales and without an apico-ventral lobe, but with a subapical lobe which is usually more or less divided into two portions and bears some modified spines and usually a leaflet. Style without spiny crest. Phallosome divided into lateral portions which usually have a complicated structure and are provided with various teeth or lobes. Paraprocts with rather dense tufts of spines or hairs at crown, and usually with basal lateral arm.

Bucco-pharyngeal armature of ♀ with one row of teeth, which may be sharp or blunt.

LARVA.—With the characters of the genus ; mouth-parts normal, not modified for predacity.

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* The figure given by Senior-White (1927, pl. xi) probably represents an *Aëdimorphus* larva in which he overlooked the single pair of very small hair-tufts.

DISTRIBUTION.—Species of this subgenus occur throughout the world; they may, however, be classed in two distinct groups, according to the presence or absence of the lower mesepimeral bristle; the species in which this bristle is lacking all have pale rings on the proboscis and tarsi, and this group is most extensively developed in the Oriental region, although many species occur in Australia and Africa. In the second group, where the lower mesepimeral bristle is present, the proboscis and tarsi are usually dark (as is the case in all Indian species); comparatively few species occur in India, several of those which are found having a wide distribution in other regions.

BIONOMICS.—All the Indian species of this subgenus breed in ground-pools, usually those of a more or less permanent nature. Several of them are among the commonest and most troublesome of Indian mosquitoes.

Key to Adults.

1.	Proboscis and tarsi with pale rings (tarsal rings sometimes faint); no lower mesepimeral bristle	2.
	Proboscis without pale ring (sometimes indistinctly ringed in ♂); tarsi entirely dark; lower mesepimeral bristle present.	13.
2.	Wings with costa dark unless at tip	3.
	Wings with three pale spots on costa (including one at tip)	12.
3.	A yellowish area at tip of wing; body and legs largely yellow	*epidesmus*, p. 389.
	No yellowish area at wing-tip; body and legs not usually extensively yellow	4.
4.	Wings speckled with pale scales, which are usually numerous	*bitæniorhynchus*, p. 391.
	Wing-scales all dark	5.
5.	Scales on anterior ⅔ of mesonotum mainly or all white or pale ochreous	6.
	Mesonotal scales mainly dark or with indefinite pale mottling	8.
6.	Abdominal tergites apically banded; mesonotal scales pale ochreous	*sinensis*, p. 394.
	Abdominal tergites basally banded; mesonotal scales white	7.
7.	Wings with broad scales on veins 1, 3, and 5; mid- and hind tibiæ with pale lines	*whitmorei*, p. 406.
	Wings without unusually broad scales; tibiæ not lined	*gelidus*, p. 407.
8.	Abdominal tergites with distinct apical pale markings	*cornutus*, p. 396.
	Markings of tergites mainly or entirely basal	9.
9.	Middle femur with a pale stripe in front	*edwardsi*, p. 397.
	Middle femur not striped	10.
10.	Femora speckled with pale scales, especially anterior surface of mid-femur	*sitiens*, p. 398.

	Femora without any sprinkling of pale scales	11.
11.	Mesonotum with light and dark scales mixed in varying proportions, sometimes forming an indefinite pattern, but at least with light scales round front margin	[*barraudi*, p. 403. [*whitei*, p. 402 ; *vishnui*, p. 400 ;
	Mesonotal scales uniformly dark brown	*tritæniorhynchus*, [p. 404.
12.	Pale spot at middle of wing involving only costa and subcosta	*mimeticus*, p. 409.
	Pale spot at middle of wing usually extending over vein 1	*mimulus*, p. 412.
13.	Pleuræ devoid of scales; proboscis all black; ♂ palpi entirely dark scaled	*nilgiricus*, p. 413.
	Pleuræ with patches of broad scales; proboscis pale beneath in middle; last two segments of ♂ palpi with a white line beneath, or at least with a white spot at the base of each	14.
14.	Fore and mid-femora and all tibiæ conspicuously striped in front	15.
	Fore and mid-femora all dark in front	16.
15.	Hind femur with a brown line beneath on distal ⅓	*theileri*, p. 414.
	Hind femur pale beneath from base to knee.	*vagans*, p. 417.
16.	Integument of pleuræ uniformly coloured; abdominal tergites basally banded	17.
	Integument of pleuræ with bare blackish-brown areas situated immediately above and below a conspicuous patch of white scales in middle	19.
17.	Two terminal segments, or at least penultimate segments, of ♂ palpi with white line beneath	18.
	Terminal segments of ♂ palpi with white basal spots beneath; very small species.	*hutchinsoni*, p. 424.
18.	Mid- and hind tibiæ with more or less obvious pale stripe on outer side; abdominal bands white; a patch of white scales behind prothoracic spiracle	*univittatus*, p. 418.
	Mid- and hind tibiæ dark, except small pale spot at tip; abdominal bands creamy; no postspiracular scales	*fatigans*, p. 420.
19.	Abdomen unbanded	*fuscocephalus*, p. 425.
	Abdomen banded	*fuscitarsis*, p. 426.

224. **Culex (Culex) epidesmus** (Theobald), 1910.

Rec. Ind. Mus. iv, p. 22 (*Tæniorhynchus*) (♀). TYPE-LOC.: Bhogaon, Purnea dist., Bihar, x. 1908 (*Paiva*). TYPE: ♀ in Ind. Mus.

Tæniorhynchus luteoabdominalis Theobald, 1910, Rec. Ind. Mus. iv, p. 23 (♀). TYPE-LOC.: Kathihar, Purnea dist., Bihar, x. 1908 (*C. Paiva*). TYPE: ♀ in Ind. Mus.

Grabhamia ochracea Theobald, 1905 (nec Theobald, 1901), Journ. Econ. Biol. i, p. 25 (♀). TYPE-LOC.: India (*Christophers*). TYPE: two co-type ♀♀ in Brit. Mus.

ADULT *.—Readily distinguished by the predominant yellow colour. Wing 4–5 mm.

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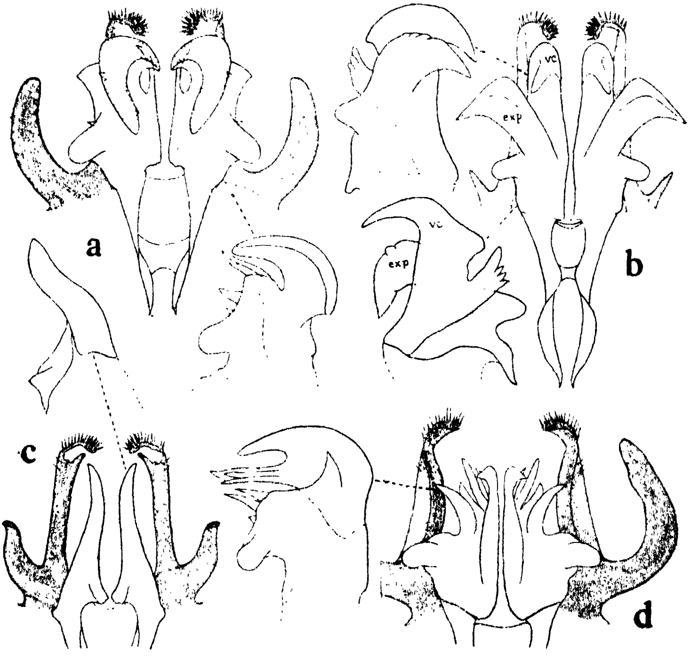
* Edwards 1913 *b*, p. 231 (syn.); Brunetti 1920, p. 133 (*Grabhamia*); Barraud 1924 *e*, p. 982.

♀.—*Head*: dorsal surface covered with narrow yellow and numerous upright yellow and brown scales, broader pale yellow scales low down at sides. Palpi mottled with yellow and brown scales. Proboscis with a yellow band or ring in middle, usually very wide and occupying nearly ⅔ of the length, but sometimes narrower; a dark area at base, usually narrow, and another dark area between pale band and labella, latter yellowish. *Thorax*: mesonotum covered with narrow yellow, brown, and white scales, the last forming indefinite patches in front of wing-roots. Scutellar scales narrow and yellow. ***Wings***: scales mainly dark, but scattered yellow scales along costa and vein 1. A pale yellowish area, sometimes indistinct, at apex of wing, including costa and veins 2.1, 2.2, and sometimes 3. ***Legs***: femora and tibiæ yellowish, with numerous scattered brown scales; tarsi brown, with rather broad basal and narrower apical yellow

Fig. 90.



♂ hypopygial structures (proctiger and phallosome) of *Culex*: **a**, *epidesmus*; **b**, *bitæniorhynchus* (with variation in form of phallosome); **c**, *sinensis*; **d**, *cornutus*. Lettering as on p. 4.

rings. Occasionally the legs are almost entirely yellow. *Abdomen* : tergites with narrow basal and much wider apical golden-yellow bands and median dark brown bands. Amount of yellow scaling variable ; occasionally dorsum is entirely yellow.

♂.—Differs from ♀ as follows :—Palpi longer than proboscis by nearly length of last two segments ; two broad yellow rings on long segment ; apical $\frac{1}{3}$ of this segment and last two segments with outstanding brown and yellow hairs ; apical $\frac{1}{2}$ of terminal segment pale ; the last two segments strongly curved upwards. Mesonotal scales often paler, and pale ring on proboscis narrower, than in ♀. *Hypopygium* (fig. 90, **a**) : *lp* with large ventral cornu and lateral process ; median process divided into several rather long teeth, as in *cornutus*. Paraproct with one large wide basal arm and another quite small.

LARVA.—Has not been isolated or described.

DISTRIBUTION.—Widely spread from the PUNJAB to ASSAM and southwards to CEYLON, but apparently never very abundant. It is, perhaps, commonest in BIHAR.

Not known from outside the Indian region.

225. Culex (Culex) bitæniorhynchus Giles, 1901.

Journ. Bomb. Nat. Hist. Soc. xiii (May), p. 607. TYPE-LOC. : Travancore (*James*). TYPE : non-existent.

Tæniorhynchus ager Giles, 1901, Entom. xxxiv (July), p. 196 (♂). TYPE-LOC. : Madras (*Cornwall*). TYPE : ♂ in Brit. Mus.

Tæniorhynchus tenax Theobald, 1901, M.C. ii (November), p. 198 TYPE-LOC. : Perak, Malay Penin., xii. 1899 (*Wray*). TYPE : ♀ in Brit. Mus.

Culex infula Theobald, 1901, M.C. i (November), p. 370 (♀). TYPE-LOC. : Taiping, Perak, Malay Penin., xii. 1899 (*Wray*). TYPE : ♀ in Brit. Mus.

Grabhamia ambiguus Theobald, 1903, M.C. iii, p. 248 (♂). TYPE-LOC. : Quilon, Travancore (*James*). TYPE : ♂ in Brit. Mus.

Grabhamia tæniarostris Theobald, 1907, M.C. iv, p. 299 (♀). TYPE-LOC. : Peradeniya, Ceylon (*Green*). TYPE : ♀ in Brit. Mus.

Tæniorhynchus tenax var. *ocellata* Theobald, 1907, M.C. iv, p. 488 (♀). TYPE-LOC. : Kuching, Sarawak, Borneo (*Barker*). TYPE : ♀ in Brit. Mus.

Oculeomyia sarawaki Theobald, 1907, M.C. iv, p. 515 (♀). TYPE-LOC. : Sarawak, Borneo (*Barker*). TYPE : ♀ in Brit. Mus.

Of the above names *ambiguus* and *tenax* are regarded as varieties.

ADULT *.—Recognized by the speckled wings, banded proboscis, and apical yellow bands on abdominal tergites. Wing about 5 mm.

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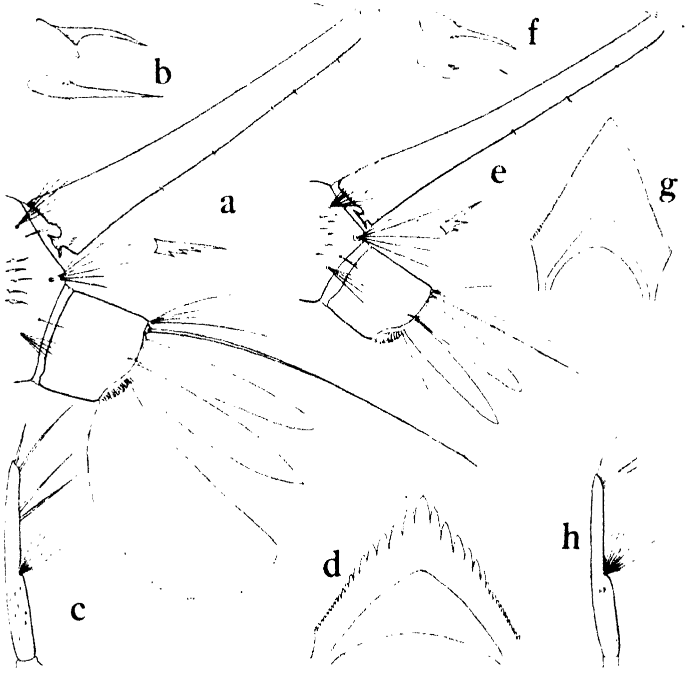
* Edwards 1913 *b*, p. 231 (syn.) ; 1921 *c*, p. 337 ; 1922 *c*, p. 282 ; 1924, p. 392, Barraud 1924 *e*, p. 984 ; Brug 1924 *b*, p. 17 ; Borel 1926, p. 81 ; Martini 1931, p. 362.

♀.—*Head*: vertex with narrow golden-yellow and numerous upright yellow and brown scales; a small darker patch on either side, and broad white scales laterally. Palpi black, with pale scales apically. Proboscis black, with a broad median creamy band and pale scaling towards tip; sometimes a speckling of pale scales between band and base. *Thorax*: mesonotum covered with narrow golden-brown scales from front to about level of wing-roots, remainder covered with brownish-black scales, except for a few golden scales in front of scutellum; usually a pair of submedian, more or less distinct, dark spots in middle of golden-brown area. Scutellum with dark brown narrow scales at base of mid-lobe, golden scales at apex and on lateral lobes. *Wings*: veins clothed with a mixture of fairly broad pale yellow and black scales, giving a speckled appearance. *Legs*: brownish-black, plentifully sprinkled with pale scales on femora, tibiæ, and first tarsal segments: tarsi dark, with narrow apical and

Fig. 91.



Larval structures of *Culex*: **a–d**, *cornutus*; **e–h**, *bitæniorhynchus*.

basal pale rings. *Abdomen*: tergites with moderately broad apical yellow bands; otherwise black, or with a sprinkling of pale scales.

♂.—Differs from ♀ as follows:—Palpi longer than proboscis by rather more than length of apical segment; two pale rings on long segment, narrow pale rings at bases of last two segments, tip of last segment broadly pale. Last two segments upturned and with numerous outstanding hairs, which are mainly dark, except at tip of apical segment. Proboscis with narrower pale band, slightly nearer apex than base. *Hypopygium* (fig. 90, **b**): *lp* variable in form; ventral cornu with a point directed ventrally; external process always large; lateral process fairly large; median process ending in a few small blunt teeth. Basal arm of paraproct comparatively small. Leaflet on subapical lobe of coxite also rather small; a second leaflet sometimes present.

var. *ambiguus*.—Differs from type-form in having fewer pale scales on wings, and many of the wing-scales are narrower. Abdomen with median basal yellow patches and apical lateral yellow patches not always forming complete bands.

var. *tenax*.—Similar to *ambiguus* as regards wing-scaling, but abdominal tergites are without basal yellow patches, the first few segments being almost entirely dark dorsally; other segments with apical yellowish lateral patches.

Numerous other variations in abdominal markings occur, in some of which the abdomen is almost entirely covered with yellowish scales dorsally [*]. In one form from Kashmir the proboscis is almost entirely pale in ♀.

LARVA [†] (fig. 91, **e–h**).—Recognized by form of mentum—triangular, pointed, and furnished with a large number of minute teeth—differing in this respect from all other known larvæ of Indian species of the genus. Length about 7 mm., including siphon, which is about 2 mm. long. Colour usually bright green. *Head* comparatively small, thinly chitinised,

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[*] [The closely allied species or variety *aurantapex* Edw. (=*domesticus* Leic., nec Germar) has apparently not been found in the Indian area, although it occurs in the Malay Peninsula and East Africa. This form somewhat resembles var. *tenax*, but has mesonotal scales almost all black; first few abdominal tergites mainly or all black, last few entirely orange. Specimens of this form might easily be mistaken for *C.* (*Lutzia*) *fuscana*, just as the typical form of *C. bitæniorhynchus* might be confused with *C.* (*L.*) *raptor* or *vorax*.]

[†] Christophers 1906, p. 11 (*T. tenax*); Edwards 1912 *b*, p. 380 (*ager* var. *ethiopicus*); Ingram & Macfie 1919, p. 65 (var. *ethiopicus* and pupa, *ager*); Barraud 1923 *c*, p. 936; Borel 1926, p. 82; Senior-White 1927, p 71; Martini 1931, p 363.

and pale. Antenna pale on basal ¾, darker apically; tuft rather nearer base than apex of shaft; latter with 6–7 minute spinelets on basal ½. Subapical bristles very near tip of shaft. Some long single hairs on prothorax; lateral hairs of *thorax* and *abdomen* moderately developed. Comb of 5–6 large sharp teeth irregularly arranged; each tooth with a few hairs at base, but no lateral denticles or fringe. *Siphon* pale, comparatively long and narrow, 6–8 times length of diameter at base. Four pairs of small subposterior hair-tufts fairly evenly spaced along apical ½ of tube. Pecten of only 3–6 small transparent teeth, difficult to detect. *Anal segment*, with its hairs and papillæ, shown in fig. 91.

Larva of var. *ambiguus*.—Differs from that of type-form as follows:—Head, antennæ, and siphon darker. Antennal shaft with about double the number of spicules. Siphon usually rather shorter. Pecten of 6–9 teeth, the most distal tooth usually much detached from others.

HABITAT.—Open weedy pools. The larva usually feeds amongst green algæ, which it resembles in colour.

DISTRIBUTION.—One of the commoner mosquitoes over the whole of the Indian region. Its range extends from AFRICA, through the Oriental region, to JAPAN and AUSTRALIA.

226. Culex (Culex) sinensis Theobald, 1903.

Culex gelidus var. *sinensis*, M.C. iii, p. 180 (♀). TYPE-LOC.: Shaohyling, China (*Cornford*). TYPE: ♀ in Brit. Mus.

Culex sepositus Leicester, 1908, Cul. Malaya, p. 152 (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: non-existent.

Tæniorhynchus tenax Leicester, 1908 (nec Theobald), Cul. Malaya, p. 167 (♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

ADULT *.—Resembles *bitæniorhynchus* in general appearance, but may be distinguished by the entirely dark scaled wings. Wing about 4 mm.

♀.—*Head*: pale narrow and upright scales on vertex; a darker patch on either side, followed lower down by a patch of broad white scales. Palpi black, with a few pale scales apically. Proboscis black, with a creamy ring in middle occupying about ¼ of the length. *Thorax*: mesonotum covered with pale ochreous or greyish-white scales from the front, continued back nearly to level of wing-roots; area behind this deep brown, except for a few pale scales in front

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* Theobald 1910 *b*, p. 313 (*Leucomyia*); Edwards 1913 *b*, p. 231 (syn.); Barraud 1924 *e*, p. 986; Brug 1924 *b*, p. 22; Martini 1931, p. 383.

of scutellum. Some specimens with a pair of submedian dark spots in the pale area, and a pair of submedian narrow bare lines continued back a short distance from front margin of mesonotum. Scutellum with dark brown scales at base of mid-lobe, light brown scales at apex and on lateral lobes. *Wings*: dark scaled; outstanding plume-scales long and narrow. *Legs*: dark brown, with lighter speckling on femora and on tibiæ of fore legs. Tarsi with narrow pale rings which are mainly basal, but include tips of segments. *Abdomen*: tergites brownish-black, with narrow ochreous apical bands, also sometimes narrow pale basal bands. In some specimens the bands are incomplete or absent, the dorsum being almost entirely dark.

♂.—Differs from ♀ as follows :—Palpi longer than proboscis by rather more than length of last segment; long segment with one narrow pale ring and a broader one nearer the apex, apical ⅓ with dark hairs on outside; last two segments with narrow basal pale rings, and dense dark hairs, except at tip of last segment, which is rather broadly pale. Proboscis with a narrower pale ring than in ♀, a little nearer apex than base. *Hypopygium* (fig. 90, **c**): *lp* with simple thumb-like ventral cornu, lateral process small, no median process. Basal arm of paraproct fairly large.

LARVA.—From two isolated skins examined this appears to be indistinguishable from the larva of *cornutus*. The anal papillæ, which have collapsed, are rather longer, being 2½ times length of chitinised part of anal segment: *isc* (present in one specimen only) have 2 branches instead of 4. Antennæ, frontal hairs, mentum, comb, and siphon resemble those of *cornutus*. Possibly small differences could be found by comparing a long series of larvæ of the two species.

HABITAT.—Rice-fields and large weedy pools.

DISTRIBUTION.—Not common in India, though widely distributed throughout the Oriental region. CENTRAL PROVINCES: Sonakhan *, Raipur dist., vii. 1928 (*Senior-White*). BIHAR: Kierpur * and Katihar *, Purnea dist. (*Paiva*); Pusa *, various dates. ORISSA: Balighai *, near Puri, 1908 (*Annandale*), and viii. 1911 (*Annandale & Graveley*). BENGAL: Diamond Harbour *, xii. 1919 (*Christophers*); Chandernagore (*Borel*): Sukna *, (*Sobha Ram*). ASSAM: Nongpoh *, Khasi Hills dist., xi. 1921 (*Christophers*); vii. 1922 (*Barraud*); Dibrugarh *, viii. 1922 (*Barraud*); Nalbari *, Kamrup dist., i. 1920 (*Taylor*). BURMA: Bhamo *, x. 1931 (*Feegrade*).

Known also from MALAY PENINSULA and ARCHIPELAGO, CHINA, FORMOSA, and JAPAN.

227. **Culex (Culex) cornutus** Edwards, 1922.

Ind. Journ. Med. Res. x, p. 283 (♂ & ♀). TYPE-LOC.: Tavargatti, Belgaum dist., Bombay Deccan, viii. 1921 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Wing about 3·5 mm.

♀.—*Head*: clothed dorsally with brown narrow curved scales; pale flat scales laterally. Proboscis brownish-back, with sharply-defined pale ring occupying about the middle ⅓. Palpi brownish-black, with some pale scales apically. *Thorax*: mesonotum covered with dark brown, rather coarse narrow scales, those on posterior part lighter; a few rather longer and wider white scales in a small patch a little in front of each wing-root. Narrow brown scales on *apn* and *ppn*. Pleuræ uniformly brown. *Wings*: veins clothed with dark, rather long, narrow scales. *Legs*: dark brown: femora and tibiæ evenly sprinkled with pale scales; tarsi with pale apical and basal rings which are mainly basal. *Abdomen*: tergites dark brown, with narrow apical pale bands, more or less separated into median and lateral spots, also narrow basal pale bands on most of segments.

♂.—Differs from ♀ as follows:—Palpi longer than proboscis by rather more than length of apical segment; last two segments and apical ⅓ of long segment densely hairy. Two pale rings on long segment; last two segments upturned and with narrow pale ring at base of each. Tip of last segment narrowly pale. Pale ring on proboscis narrower. *Hypopygium* (fig. 90, **d**): *lp* with several pointed processes directed dorsally, much as in *epidesmus*. Basal arm of paraproct very wide and long.

LARVA ‡ (fig. 91, **a–d**).—Closely similar to *sinensis*: differs from *bitæniorhynchus* as follows:—Subapical bristles on antenna some distance from tip of shaft, almost midway between tuft and apex. Mentum with much larger teeth towards apex, those towards base on either side very small. Comb of 4–6 large sharp teeth arranged more or less in a row. Pecten of only 2–4 very small teeth placed close together. Siphon with 5–6 pairs of small subposterior hair-tufts. A slightly hooked spine at tip of siphon anteriorly.

HABITAT.—Ground-pools, pools in jungle, fallow rice-fields, etc.

DISTRIBUTION.—BOMBAY PRESIDENCY: Tavargatti *, type-locality, as given above; Deccan, Belgaum *, viii. 1921 (*Barraud*); Bombay Harbour, Trombay *, and Hog Island *, vii. 1921 (*Barraud*); North Kanara, Karwar (*Cogill*). MADRAS PRESIDENCY: Ennore *, coast near Madras, xii. 1919 (*Christophers*).

Not known from other countries.

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† Barraud 1924 *c*, p. 988.

‡ Barraud 1923 *c*, p. 937.

228. **Culex (Culex) edwardsi** Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 507 (♀). TYPE-LOC.: Shillong, Khasi Hills, Assam, vi. 1922 (*Barraud*). TYPE: ♀ in Brit. Mus.

ADULT *.—Resembles *sitiens*, but differs from that, and other allied species, in having the femora and tibiæ of mid- and hind legs marked with distinct longitudinal pale stripes. Wing (♀) about 4·2 mm.

♀.—*Head*: vertex and nape covered with yellowish-brown narrow and upright scales. Palpi dark, with a few pale scales apically. Proboscis black, with a well-defined pale band in middle, occupying about ⅕ of the length, rather wider below than above. *Thorax*: integument of mesonotum brownish-black, with dark brown and yellowish-brown narrow scales, latter chiefly towards lateral margins and in front of scutellum. Narrow pale brown scales on *apn* and *ppn* and scutellum. Integument of pleuræ pale brown, with several indistinct darker areas, and patches of broad white scales. *Wings*: dark scaled, outstanding scales rather narrow; base of posterior fork-cell slightly nearer base of wing than that of anterior. *Legs*: all femora broadly pale posteriorly; fore pair dark anteriorly, with numerous pale scales, sometimes tending to form patches, at about the middle; mid-pair dark anteriorly, with a well-defined pale longitudinal stripe running the whole length; hind pair broadly pale on basal ½ on outer side, except dorsally, apical ½ dark, with a longitudinal pale stripe to tip. Mid- and hind tibiæ dark brown, with a pale line on outer side from base nearly to tip; fore tibiæ pale, but without a definite stripe. Tarsi dark brown, with narrow but distinct pale rings which are mainly basal, but include tips of segments as well as apices of tibiæ; segment 1 of hind tarsi with a pale line on outer side from near base to near apex.

♂.—Palpi longer than proboscis by rather more than length of rather long apical segment; long segment with two pale rings, that nearer base narrower than that nearer apex; a fairly long row of small hairs projecting downwards from underside of long segment, as well as numerous long hairs projecting laterally from apical part of this segment; last two segments with basal pale rings, and numerous outstanding dark hairs, except at tip of last segment, where they are pale. Proboscis with fairly wide pale band in middle, and some fairly long hairs projecting downwards from underside at about level of basal border of pale band Pale ochreous or nearly white basal abdominal bands rather wider than in ♀; otherwise markings are very similar. *Hypopygium* (fig. 92, **c**): *lp* resembling *sitiens* and *cornutus*; median process with rather large teeth, external process pointed and caudally directed. Paraproct with numerous spines at crown and a long pointed basal arm.

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* Barraud 1924 *c*, p. 995.

LARVA.—Unknown.

DISTRIBUTION.—ASSAM : Shillong *, as given above. CENTRAL INDIA : Amol Nullah *, near Birsinghpur, Rewa State (*Senior-White*). SOUTH INDIA : Mercara * and Virajpet *, Coorg, vi. 1927 (*Baily*).

Not known from elsewhere.

229. Culex (Culex) sitiens Wiedemann, 1828.

Aussereur. Zweifl. Insec. i, p. 542. TYPE-LOC. : Sumatra. TYPE : non-existent.

Culex impellens Walker (nec Theobald), 1860, Proc. Linn. Soc. Lond. iv, p. 91 (♀). TYPE-LOC. : Makessar, Celebes (*Wallace*). TYPE : ♀ in Brit. Mus.

Culex microannulatus Theobald, 1901, M.C. i, p. 353 (♂ & ♀). TYPE-LOC. : Quilon, Travancore, S. India, iii. 1900 (*James*). TYPE : ♂ & ♀ in Brit. Mus.

Culex nigricephala Leicester, 1908, Cul. Malaya, p. 149 (♂ & ♀). TYPE-LOC. : Batu Gajah, Malay Penin. (*Daniels*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT †.—A rather larger and darker mosquito than *vishnui* and allied species. Wing about 4 mm.

♀ and ♂.—General coloration brownish-black. *Head* with narrow brown and upright black scales on vertex and nape, and broad pale scales low down at each side. Proboscis black, with a creamy band in middle, of about same width in the two sexes. Palpi of ♀ black, with white scales apically ; in ♂ with 2 pale rings on long segment, narrow basal pale rings to last two segments, tips rather broadly pale, otherwise outstanding hairs on last two segments are dark ; a row of stiff translucent hairs projecting downwards from underside of long segment, as in *vishnui*. *Thorax* : mesonotum covered with dark brown narrow scales, usually some paler scales towards lateral margins. Scutellar scales narrow and pale brown. *Wings* : scales dark and moderately broad ; fork-cells rather short, base of anterior slightly nearer wing-tip than that of posterior. *Legs* : brownish-black ; anterior surface of femora speckled with pale scales, most marked on mid-legs ; mid- and hind tibiæ with a pale line on the outside, not always very pronounced. Tarsi with distinct, but rather narrow, basal and apical pale rings. *Abdomen* : tergites brownish-black, with rather narrow basal white bands. ♂ *hypopygium* (fig. 92, **b**) : *lp* with a larger external process than in *vishnui* and allies; median process with several teeth, one larger and longer than others.

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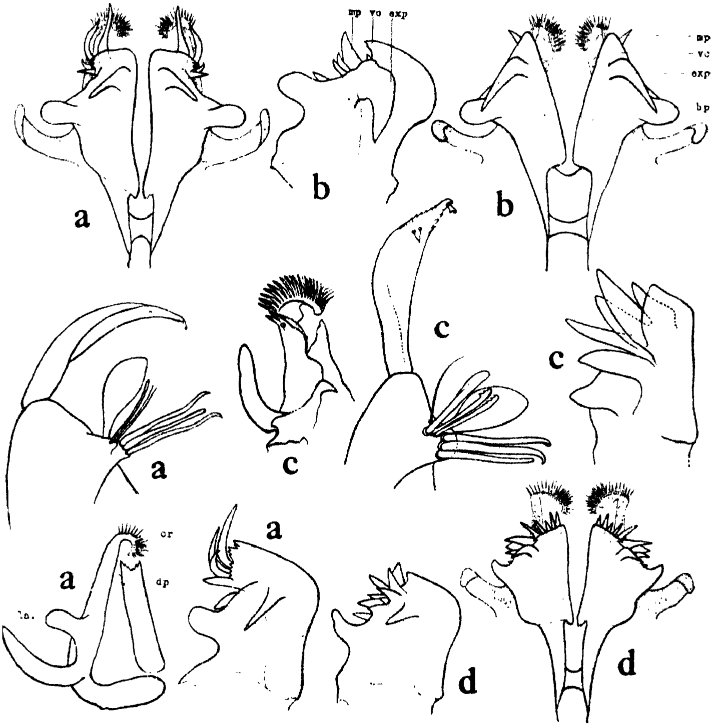
† Edwards 1913 *b*, p. 232 (syn.) ; 1924, p. 394 ; Barraud 1924 *e*, p. 993 ; Brug 1924 *b*, p. 13 ; Borel 1926, p. 91.

LARVA * (fig. 93, **a**).—Antenna, mentum, siphon-tube, and anal segment as shown in figures. Distinguished from other known larvæ of this group by the comparatively short and wide siphon, which is only 2–2½ times length of diameter at base, and by the short anal papillæ †. There are usually 6 pairs of tufted hairs on the siphon, one of these being lateral, the others near posterior border. The pecten-teeth have numerous denticles along one side.

Fig. 92.



♂ hypopygial structures of *Culex*: **a**, *vishnui*; **b**, *sitiens*; **c**, *edwardsi*; **d**, *whitei*. Lettering as on p. 4.

HABITAT.—Brackish pools near sea-coast.

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* Barraud 1924 *m*, p. 427; Cooling 1924, p. 36; Hill 1925, pl. viii; Borel 1926, p. 92; Buxton & Hopkins 1927, p. 79.

† [This larva is also distinguished rather sharply from all other Indian species of *Culex* by the remarkably thick preclypeal spines. Specimens in the British Museum from Fiji, South China, Bombay, and East Africa all show this feature.]

DISTRIBUTION.—Common on sea-coast, and probably occurring all round Indian coast-line. Not usually found far inland.

The range extends from EAST AFRICA, throughout the whole of the ORIENTAL REGION, to AUSTRALIA and FIJI.

230. **Culex (Culex) vishnui** Theobald, 1901 *.

M.C. i, p. 355 (♀ only). TYPE-LOC.: Madras (*Cornwall*). TYPE: ♀ in Brit. Mus.

Culex impellens Theobald, 1901 (nec Walker), M.C. i, p. 362 (♀).

var. *perplexus* (*Culex perplexus*) Leicester, 1908, p. 150 (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—A very common small brown mosquito, with a pale band on the proboscis; distinguished from several closely allied species by structure of ♂ hypopygium, larval characters, and scaling of mesonotum and of ♂ palpi. Wing about 3–3·5 mm.

♀.—*Head*: narrow and upright pale brown scales on vertex and nape (in some specimens scales are brown or dark brown). Palpi dark brown, with usually some pale scales at tips. Proboscis dark brown, with a fairly distinct pale band, rather nearer apex than base; sometimes small areas of pale scaling may be present between pale band and base. *Thorax*: mesonotum clothed with golden-brown, or pale brown, narrow scales; in some specimens there is a mixture of rather dark brown and pale scales, latter forming a more or less distinct pattern. *Wings*: dark scaled; outstanding series narrow; base of anterior fork-cell usually very slightly nearer base of wing than that of posterior. *Legs*: dark brown; tarsi with very narrow, often indistinct, pale rings, which are mainly basal, but involve apices of some segments. Fore and mid-femora dark brown on anterior surface, without any speckling of pale scales. Hind femur with pale scaling on outer side from base nearly to knee, and with sharply-contrasted dark scaling dorsally from near base to knee. Mid- and hind tibiæ with more or less defined pale stripe on outer side for nearly whole length. *Abdomen*: tergites dark brown or black, with well-marked ochreous basal bands.

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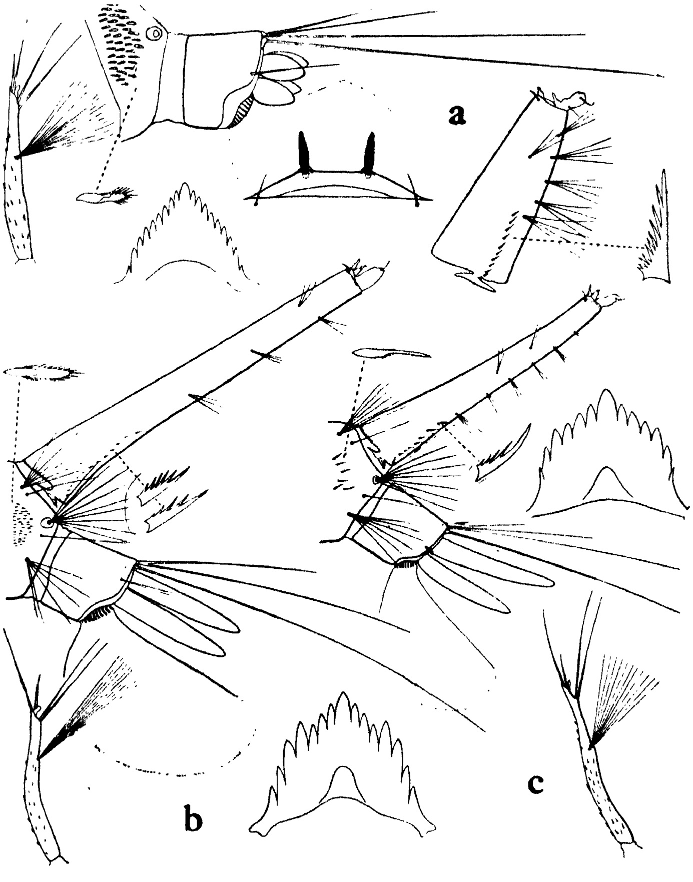
* *C. summorosus* Dyar, of the Philippine Islands, considered by Edwards to be synonymous with *vishnui*, appears to me to be distinct from examination of adults and larval skins sent to me from those islands. The adults agree very closely with *vishnui*, but the larval skins show definite structural differences. This form has so far not been met with in India.

† Edwards 1913 *b*, p. 233 (syn.); 1917; p. 225 (syn.); 1921 *c*, p. 339; Barraud 1924 *e*, p. 996; Brug 1924 *b*, p. 15; Borel 1926, p. 93; Martini 1931, p. 392.

♂.—Palpi longer than proboscis by rather more than length of last segment; dark brown, with two pale rings on long segment, and a row of stiff translucent hairs projecting downwards from beneath, in addition to some long hairs projecting laterally. Pale rings at bases of last two segments; tip of last segment and hairs pale; otherwise outstanding hairs are dark. Bases of fork-cells of wing about level. *Hypopygium* (fig. 92, **a**): *lp* with median process divided into teeth directed caudally, one tooth much longer than

Fig. 93.



Larval structures of *Culex* (antenna, mentum, tail-end, enlarged pecten- and comb-teeth): **a**, *sitiens* (extra figure showing thickened preclypeal spines); **b**, *barraudi*; **c**, *vishnui*.

others and projecting some distance beyond plate. Paraproct with basal and lateral arms.

LARVA * (fig. 93, **c**): head comparatively large. *Antenna* of moderate length, with tuft at $\frac{2}{5}$ of length from base, and with preapical bristles slightly below tip. Shaft of antenna dark at base and on part beyond tuft; fairly numerous spinelets along nearly whole length. *Frontal hair A* conspicuously dark. Teeth of mentum rather large and all about same size, 6–8 on either side of central one. Comb of 6–7 large sharp teeth set in an irregular row (differing from the larvæ of *tritæniorhynchus, barraudi,* and *whitei* in this respect). *Siphon* 4–6 times length of diameter at base, with 6–7 pairs of rather small tufted hairs along posterior border, and two small pairs of lateral hairs of 2–3 branches. Pecten of 9–11 teeth, the distal teeth large and curved and about same size as comb-teeth; *isc* 3-branched; *lh* very small, with several branches. Dorsal pair of anal papillæ about length of longest fan-hairs, ventral pair a little shorter.

HABITAT.—Ground-pools of almost every description, rice-fields, salt marshes, etc.

DISTRIBUTION.—One of the commonest of Indian mosquitoes. From examination of ♂ hypopygia and of larvæ it has been ascertained that this species is present from the NORTH-WEST FRONTIER to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON. It is less common at high elevations, and in the Western Himalayas at altitudes of over 5,000′ it is usually replaced by *barraudi,* and in parts of the Assam hills by *whitei.*

Its range extends from MESOPOTAMIA to CHINA and JAPAN, and throughout the Oriental region as far south-east as NEW GUINEA.

231. **Culex (Culex) whitei** Barraud, 1923.

Ind. Journ. Med. Res. xi, p. 508 (♂ & ♀). TYPE-LOC.: Haflong, Cachar Hills, Assam, viii. 1922 (*Barraud*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT †.—Resembles *vishnui* and *barraudi* very closely, but differs from both in structure of ♂ hypopygium, from the former on larval characters and from one or both in the following points:—Palpi of ♂ with a row of stiff translucent hairs projecting downwards and inwards, in addition to some long hairs at apex projecting laterally, as in *vishnui* and *sitiens* (there is no row of stiff hairs in *barraudi* and *tritæniorhynchus*). Bases of anterior and posterior fork-cells usually about level in both sexes, but, if not, that of the posterior is slightly nearer base of wing than that of anterior.

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* Barraud 1923 *c*, p. 938; Borel 1926, p. 95; Senior-White 1927, p. 71; Martini 1931, p. 392.

† Barraud 1924 *c*, p. 998.

♂.—*Hypopygium* (fig. 92, **d**): *lp* with more numerous and shorter teeth than in allied species (compare with figs. 92, **a–c**, & 94, **a**, **b**).

LARVA.—From one incomplete larval skin, from which a ♂ of this species resulted, it can be seen that in most structural details the larva resembles *barraudi* and *tritæniorhynchus*, differing from *vishnui* in having numerous small teeth in the comb arranged in a triangular patch. Further material is required before a detailed description can be given.

HABITAT.—Ground-pools, rice-fields, etc.

DISTRIBUTION (as checked by author by examination of ♂♂).—ASSAM: Haflong, as given above; Shillong and Nongpoh, Khasi Hills dist., vi. & vii. 1922 (*Barraud*).

Also Chiengmai, SIAM, xii. 1930 (*Sinton*).

232. **Culex (Culex) barraudi** Edwards, 1922 †.

Ind. Journ. Med. Res. x, p. 284 (♂ & ♀). TYPE-LOC.: Mahdopur, Punjab, iv. 1921 (*Barraud*). TYPE: ♂ in Brit. Mus.

ADULT.—Resembles *vishnui* very closely, but differs in structure of ♂ hypopygium, in larval characters, and in absence of a row of stiff hairs on underside of long segment of palp of ♂. Base of posterior fork-cell of wing usually slightly nearer base of wing than that of anterior, though sometimes the bases may be about level.

♂.—*Hypopygium* (fig. 94, **a**): *lp* with about 5 teeth, all about same length and evenly spread out. Basal arm of paraproct long and pointed.

LARVA ‡ (fig. 93, **b**).—Differs from *vishnui* in several characters, chiefly in having numerous small teeth in the comb, arranged in a triangular patch. Resembles *tritæniorhynchus* very closely, differing as follows:—Teeth of mentum of more irregular sizes; siphon usually longer; *lh* of 2 fairly long fine branches; siphon with usually only 3 pairs of subposterior tufted hairs and one lateral hair.

HABITAT.—Ground-pools, marshes, etc.

DISTRIBUTION.—PUNJAB: Mahdopur *, type-locality, as given above; Pathankot * and Amritsar *, iv. & v. 1921 (*Barraud*); Kalka *, iv. 1922 (*Barraud*). WESTERN HIMALAYAS: Kasauli *, 5,000′, 1921–23 (*Christophers & Barraud*); Murree *, 7,000′, 1922 (*Gill*). SOUTH INDIA: Karikal, Tanjore (*Borel*). CEYLON (*Senior-White*).

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† Barraud 1924 *e*, p. 997.

‡ Barraud 1923 *c*, p. 939; Senior-White 1927, p. 71.

* ♂♂ examined by Author.

233. **Culex (Culex) tritæniorhynchus** Giles, 1901.

Journ. Bomb. Nat. Hist. Soc. xiii, p. 606 (May). Type-loc. : Travancore, South India (*James*). Type : ♀ in Brit. Mus.

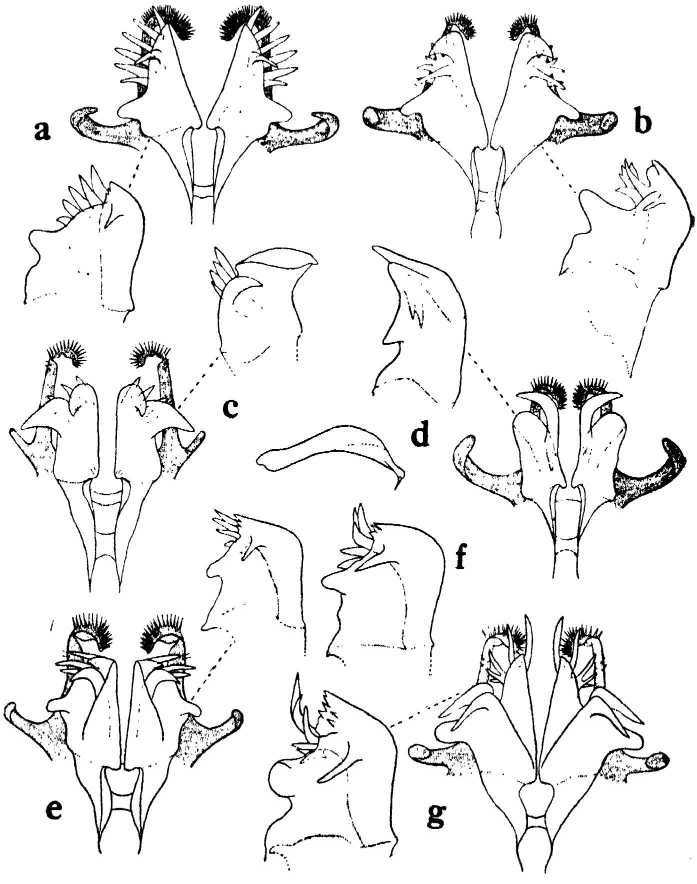
Culex vishnui Theobald, 1901, M.C. i, p. 355 (♂ only). Type-loc. : Quilon, Travancore (*James*). Type : ♂ in Brit. Mus.

Culex annulus Theobald, 1901, M.C. i, p. 358 (November) (♀). Type-loc. : Tai Po, Pokfulam, Hong Kong (*Rees*). Type : ♀ in Brit. Mus.

Culex sitiens Theobald, 1901 (nec Wiedemann), M.C. i. p. 360 (described as *C. sitiens* Wied. from ♀♀ from Taiping, Perak, Malay Penin. (*Wray*).

Culex biroi Theobald, 1905, Ann. Mus. Nat. Hung. iii, p. 82 (♂ & ♀). Type-loc. : Bombay, 1902 (*Biró*). Type : ♂ & ♀ in Nat. Mus. Hung., Buda Pest.

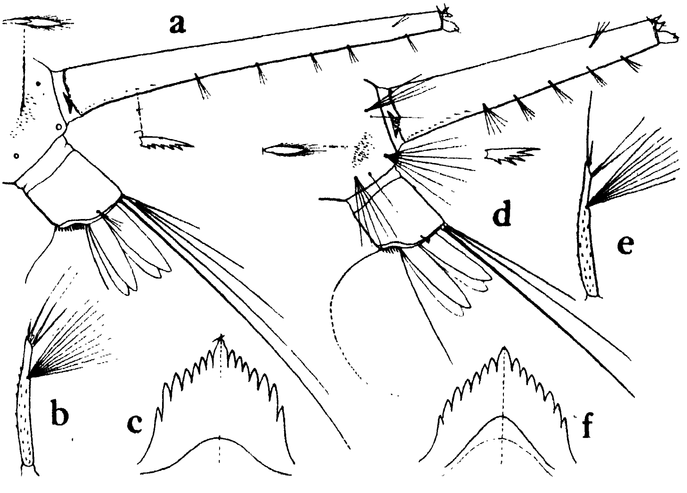
Fig. 94.



♂ hypopygial structures (proctiger and phallosome) of *Culex* : **a,** *barraudi* ; **b,** *tritæniorhynchus* ; **c,** *whitmorei* ; **d,** *gelidus* (with style on smaller scale) ; **e,** *mimeticus* ; **f,** *mimeticus* var. *mimuloides* (side view of phallosome only) ; **g,** *mimulus*.

ADULT *.—Very similar in appearance to *vishnui*, *barraudi*, and *whitei*, but usually rather smaller, and differs from some or all of these three as follows:—Mesonotum uniformly clothed with dark brown scales. Femora and tibiæ dark brown, except undersides of femora; hind femur pale dusky from base to tip on outer side, slightly darker dorsally (in allied species the dark and light areas are usually more sharply defined); tibiæ without any indication of pale stripes. Palpi of ♂ dark at tip, and without a row of stiff translucent hairs on underside of long segment. Pale band on proboscis of ♀ often extended towards base on underside, and occasionally on to sides and upper surface. Base of anterior fork-cell in wing of ♀ usually nearer base of wing than that of posterior cell. *Hypopygium* (fig. 94, **b**): *lp* of characteristic form (compare with figs. 92, **a**, **d**, & 94, **a**).

Fig. 95.



Larval structures of *Culex tritæniorhynchus* Giles: **a**–**c**, variety (?) from Karwar; **d**–**f**, typical form.

LARVA † (fig. 95).—Very similar to *barraudi* and *whitei*, differing from former in shape of mentum and in length of *lh* (compare figs. 93, **b**, & 95). There are usually five pairs of hair-tufts along the posterior border of siphon and one lateral pair. Some variation has been noted ; in fig. 95 **d–f** represent the form regarded as typical, **a–c** another form found at Karwar.

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* Giles 1901 *b*, p. 192; Edwards 1913 *b*, p. 233 (syn.); 1917, p. 224; 1921 *c*, p. 339; Barraud 1924 *e*, p. 995; Brug 1924 *b*, p. 16; Kirkpatrick 1925, p. 111; Borel 1926, p. 96; Martini 1931, p. 387.

† Ingram & Macfie 1917 *b*, p. 149, and p. 86 (pupa); Edwards 1921 *c*, p. 339; Barraud 1923 *c*, p. 940; Kirkpatrick 1925, pp. 114, 115 (and pupa); Borel 1926, p. 96; Martini 1931, p. 389.

HABITAT.—As given for *vishnui*.

DISTRIBUTION.—As widely spread in India as *vishnui*, but usually less common than that species.

Range extends from the MEDITERRANEAN to CHINA and JAPAN, and from WEST AFRICA and EGYPT, through the ORIENTAL REGION, as far south-west as CELEBES.

234. **Culex (Culex) whitmorei** (Giles), 1904.

Journ. Trop. Med. vii, p. 367 (*Tæniorhynchus*) (♀). TYPE-LOC. : Philippine Is. (*Whitmore*). TYPE : ♀ in Brit. Mus.

Tæniorhynchus argenteus Ludlow, 1905, Can. Ent. xxxvii, p. 98 (♀). TYPE-LOC. : Luzon, Philippine Is. (*Whitmore*). TYPE : ♀ in U.S. Nat. Mus.

Leucomyia plegipennis Theobald, 1907, M.C. iv, p. 375 (♀). TYPE-LOC. : Kobe, Japan (*Cornford*). TYPE : ♀ in Brit. Mus.

Culex albus Leicester, 1908, Cul. Malaya, p. 148 (♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♀ in Brit. Mus.

Culex loricatus Leicester, 1908, Cul. Malaya, p. 151 (♀). TYPE-LOC. : Kuala Lumpur, Malay Penin. (*Leicester*). TYPE : ♀ in Brit. Mus.

ADULT *.—A rather small mosquito with white scaling over larger part of mesonotum. Resembles *gelidus*, but differs as stated in key. Wing about 3·5 mm.

♀.—*Head* : vertex and nape covered with narrow and upright white scales, darker scales towards sides, and broader white scales laterally. Palpi dark, with white scaling apically. Proboscis brownish-black, with a wide pale ring or band occupying the middle ⅓. *Thorax* : mesonotum covered with white or greyish-white scales from front as far back as level of wing-roots, the pale area continued posteriorly in four lines of yellowish-white scales to scutellum, spaces between lines brownish-black. Scutellum clothed basally with dark scales, apically with pale scales. *Wings* : median series of scales rather broad and dark, particularly on costa, subcosta, and veins 1, 3, and 5. *Legs* : dark brown ; femora speckled with pale scales ; mid- and hind tibiæ more or less lined with pale scaling on outer side. Tarsi with well-marked basal pale rings, not involving the apices of segments. *Abdomen* : tergites brownish-black, with narrow yellowish basal bands, usually triangularly produced in middle nearly to apical margin of each segment.

♂.—Palpi longer than proboscis by rather more than length of apical segment. Long segment with a narrow pale ring near base and a wider ring nearer apex, last two segments

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* Edwards 1913 *b*, p. 232 (syn.) ; 1917, p. 225 (syn.) ; Barraud 1924 *e*, p. 988 ; Brug 1924 *b*, p. 21 ; Martini 1931, p. 393.

with narrow basal pale rings and outstanding dark hairs, except at tip of last segment, where they are pale. Pale band on proboscis narrower than in ♀, and rather beyond middle. *Hypopygium* (fig. 94, **c**): *lp* with ventral cornu and large external process; median process with four subequal teeth; no lateral process. Basal arm of paraproct small.

LARVA * (fig. 96, **g–k**).—*Antenna* unusually long, shaft with spicules; tuft at ⅔ from base; preapical bristles slightly below tip; one apical bristle much longer than other. Mentum with large regular teeth, 6–7 either side of central one. *Comb* of about 7 large sharp teeth set in an irregular row. *Siphon* unusually small and curved forwards, 4–5 times length of diameter at base; 5–6 pairs of 2-branched, fairly long, subplumose hairs along posterior border; 2 pairs of lateral 2-branched shorter hairs. Pecten of 8–14 teeth, with lateral denticles; a pair of fairly long bristles at apex of siphon, with hairs around their bases. *Anal segment*: both *osc* and *isc* single and long; *lh* rather small and of several branches. Both pairs of papillæ pointed and as long as siphon. Fan-hairs rather shorter than papillæ.

DISTRIBUTION.—Although this was not recorded from India before about 1923, it is widely spread and common from the PUNJAB to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON. It has been found up to 7,500′ in the Nilgiri Hills, SOUTH INDIA.

Known also from MALAY PENINSULA and ARCHIPELAGO, PHILIPPINES, WEST CHINA, and JAPAN.

235. **Culex (Culex) gelidus** Theobald, 1901.

M.C. ii, p. 20 (♀). TYPE-LOC.: Selangor, Malay Penin., x. 1899 (*Butler*). TYPE: ♀ in Brit. Mus.

var. *cuneatus* Theobald, 1901, M.C. ii, p. 22 (♀). TYPE-LOC.: Taiping, Perak, Malay Penin., xii. 1899 (*Wray*), and Quilon, Travancore (*James*). TYPE: 2 co-type ♀♀ in Brit. Mus.

var. *bipunctatus* (of "*Leucomyia gelidus*") Theobald, 1907, M.C. iv, p. 374 (♂). TYPE-LOC: India (*Aldrich*); Sarawak, Borneo (*Barker*). TYPE: ♂ in Brit. Mus.

ADULT ♀ and ♂ †.—Very similar to *whitmorei* in size and general appearance, but differs as follows:—Anterior white area of mesonotum not produced in lines to scutellum, the space behind level of wing-roots being entirely brownish-black. Pale band on proboscis of ♀ usually narrower and rather further from base. Wings with scales in median series smaller and narrower. Pale bands on tarsi narrower

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* Barraud 1923 *c*, p. 941; Senior-White 1927, p. 71; Martini 1931, p. 394.

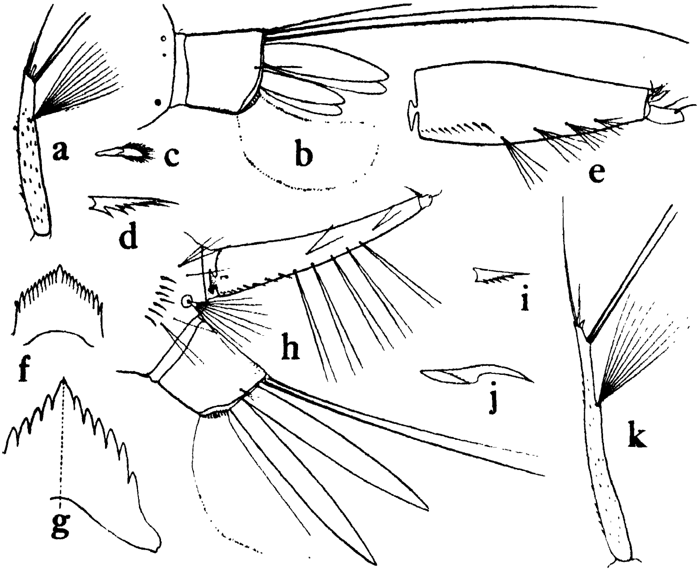
† Theobald 1907, p. 372 (*Leucomyia*); Barraud 1924 *e*, p. 990; Brug 1924 *b*, p. 19; Borel 1926, p. 88.

and involving apices as well as bases of segments. Femora not speckled and tibiæ not lined with pale scales, uniformly dark in front and above.

♂.—*Hypopygium* (fig. 94, **d**): ventral cornu of *lp* with a pointed tip directed dorsally; median process with 2 teeth pointing downwards; lateral process well developed; external process rounded. Basal arm of paraproct long. Style expanded in middle, abruptly narrowed at tip; a small terminal appendage.

var. *cuneatus*.—The commonest form, in which the basal pale abdominal bands are triangularly produced in the middle.

Fig. 96.



Larval structures of *Culex*: **a–f**, *gelidus*; **g–k**, *whitmorei* (**c**, **j**, comb-teeth; **d**, **i**, pecten-teeth).

var. *bipunctatus*.—Resembles var. *cuneatus* except that there is a pair of submedian dark spots in the white-scaled area of mesonotum.

LARVA * (fig. 96, **a–f**).—Remarkably distinct from that of *whitmorei*. *Antenna* comparatively short; tuft at $\frac{2}{3}$ from base; subapical bristles very near tip of shaft; part of latter basal to tuft with small spinelets. Mentum with 9–10 rather small teeth either side of central one. *Comb* of about 35 small teeth in a triangular patch. *Siphon* widest

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* Barraud 1924 *m*, p. 428; Borel 1926, p. 90.

towards middle and slightly tapering towards apex, 3–4 times length of diameter at base. Four pairs of 4–5-branched hairs along posterior margin, no lateral tufts. Pecten of 9–11 moderately large teeth, each with 4–5 sharply-pointed lateral denticles. *Anal segment* enclosed in smooth chitinous ring; *isc* 2-branched; *lh* single, moderately long. Dorsal papillæ about length of the rather short fan-hairs; ventral papillæ shorter.

HABITAT.—Ground-pools, usually those containing much weed; marshy tracts, etc.

DISTRIBUTION.—Common over the larger part of the Indian region from PUNJAB to ASSAM and BURMA, and southwards to CEYLON.

Also found in MALAY PENINSULA, many of the islands of the DUTCH EAST INDIES, and PHILIPPINES, SIAM, COCHIN CHINA, and FORMOSA.

236. **Culex (Culex) mimeticus** Noé, 1899.

Bull. Soc. Ent. Ital. xxxi, p. 240 (♀). TYPE-LOC.: Basilicata, Italy. TYPE: in Rome Univ. Mus.

var. *mimuloides* Barraud, 1924, Ind. Journ. Med. Res. xi, p. 992 (*vide* below). TYPE-LOC.: Nilgiri Hills, S. India.

ADULT *.—Distinguished from all other known species of Indian *Culex*, except *mimulus*, by the spotted wings, which resemble those of some species of *Anopheles* †. Wing about 4·5–5 mm.

♀.—*Head*: vertex and nape covered with pale brown narrow scales and brown and black upright scales. Palpi black, narrowly pale apically. Proboscis black, with a well-defined median creamy ring. *Thorax*: mesonotum covered with bright brown narrow scales and with usually a mixture of lighter scales forming indefinite patches round front margin and (a pair) in middle; *apn*, *ppn*, and scutellum with narrow

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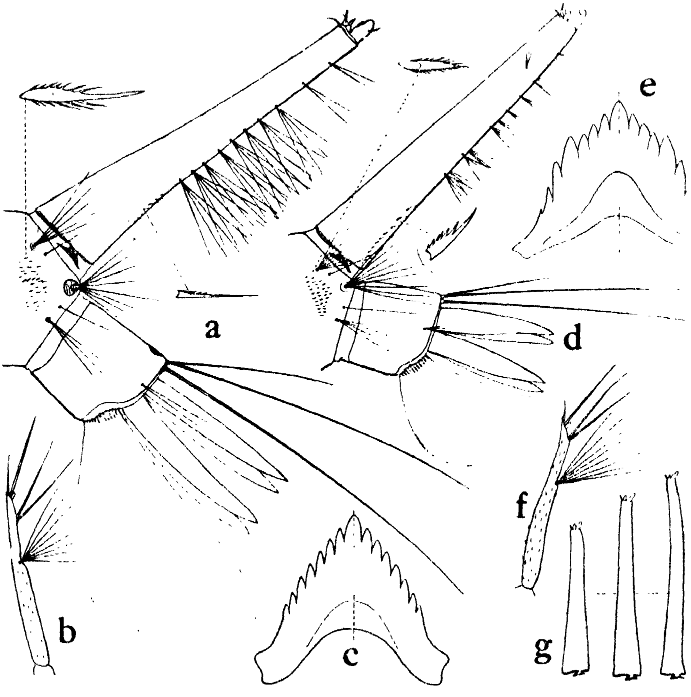
* Edwards 1921 *c*, p. 337; Barraud 1924 *e*, p. 991; Borel 1926, p. 83; Martini 1931, p. 371.

† [In addition to *C. mimeticus* and *C. mimulus*, two other species of this group are known, both differing from either of the Indian species in the ♂ hypopygium and also in wing-markings. These are: (1) *C. diengensis* Brug, of Mt. Dieng, Java, which resembles *mimeticus* in that the middle costal spot involves only the costa and subcosta (not vein 1), but veins 3 and 5.1 are pale practically to the tips, and 5.2 has a small pale spot at tip, ♂ style remarkably broad; and (2) *C. orientalis* Edw., of Japan and China, with middle costal spot not only involving vein 1 (as in *mimulus*), but even spreading across vein 4; tip of 5.2 broadly pale, and often a pale area on 5 before the fork, also (in ♀) a small pale area at base of 1, ♂ coxite with tip narrowed and provided with a tuft of short hair.

For further notes on the species of this group, *vide* Appendix.]

pale brown scales. *Wings*: marked with light and dark scales, the former forming spots, as follows:—A small pale spot on costa and subcosta [but not involving vein 1] at about middle of wing: another larger spot immediately beyond subcostal junction, involving costa (sometimes tip of subcosta) and vein 1, and one near tip of wing on costa, vein 1, and 2.1. Vein 3 usually extensively pale, but length of pale area variable [tip always dark]. Small spots at bifurcations of veins 2 and 4. A pale area in middle of 5.1 [leaving tip broadly dark], and broad pale area on basal ½ of 6 [usually leaving a short dark area at base of vein; 5 and 5.2 entirely dark]. *Legs*: brownish-black, marked with pale scaling. Femora pale posteriorly and ventrally for nearly whole length from base, and with pale knee-spots. Fore and mid-tibiæ striped with pale scaling on outer sides for whole length; hind tibia with similar stripe on middle ¾. Tarsal segment 1 on all legs indistinctly striped with pale scaling; narrow

Fig. 97.



Larval structures of *Culex*: **a–c**, *mimeticus*; **d–g**, *mimulus* (with variations in length of siphon-tube).

pale rings over tibio-tarsal joint and over joints between tarsal segments. *Abdomen*: tergites brownish-black, with narrow basal pale bands.

♂.—Palpi with one narrow and one broad pale ring on long segment; narrow basal pale rings to last two segments, and outstanding dark hairs, except at tip of last segment, which is narrowly pale. Proboscis with narrower pale ring than in ♀, and pale spots on wings usually less pronounced. *Hypopygium* (fig. 94, **e**): *lp* with 3 straight teeth all about same length, and one smaller, directed outwards. Basal arm of paraproct well developed, but rather short.

var. *mimuloides*.—Some specimens from the Nilgiri Hills are intermediate between typical *mimeticus* and *mimulus*, both in markings and in structure of ♂ hypopygium, but show variation in the former. In some specimens the wing-markings are very similar to the Himalayan form, in others the pale area on vein 3 is much reduced, and in some there is a small pale spot at tip of 5.2. Two ♀♀ have a pale spot in the middle of vein 4.2. *Hypopygium* (fig. 94, **f**): *lp* usually with 5 stout teeth, three of which are curved and more caudally directed than in the Himalayan form, and basal arm of paraproct longer, being nearly length of plate. Larvæ have not yet been isolated.

LARVA *, Himalayan form † (fig. 97, **a**–**c**).—*Antenna* dark towards apex, otherwise pale; small spinelets on basal $\frac{2}{3}$ of shaft: tuft at $\frac{3}{5}$ from base; subapical bristles some little distance below tip of shaft, but nearer to it than to the tuft (about $\frac{3}{5}$–$\frac{2}{3}$ of the distance between tuft and apex). [Preclypeal spines stout and dark.] Mentum with 7–9 fairly large regular teeth either side of central one. *Comb* a triangular patch of about 35 teeth, each having a long point and lateral fringe. *Siphon* $4\frac{1}{2}$–7 times length of diameter at base, with 8–10 hairs of 4–5 branches, which are twice length of diameter of siphon in middle and sometimes arranged in 4–5 pairs, arising between pecten and apex of tube, those nearest apex usually 2–3-branched. Pecten of 12–23 long narrow teeth, with hair-like lateral denticles. *Anal segment* with its hairs and papillæ as shown in figure.

DISTRIBUTION.—Common along HIMALAYAS, to ASSAM hills, and highlands of BURMA and COCHIN CHINA. Also in hills of SOUTH INDIA and CEYLON.

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* Christophers 1906, p. 9; Barraud 1923 *c*, p. 941; Séguy 1925 *b*, p. 16; Borel 1926, p. 83; Martini 1931, p. 373. Pupa:—Theodor 1924, p. 341.

† [Larval skins in the British Museum from Palestine and Hong Kong agree with Barraud's description and figures.]

Known also from MEDITERRANEAN REGION, CHINA, and FORMOSA. Like other hill-species, it is occasionally found in the plains of India.

237. **Culex (Culex) mimulus** Edwards, 1915.

Bull. Ent. Res. v, p. 284 (♂ & ♀). TYPE-LOC.: Sarawak, Borneo (Sarawak Mus. Coll.). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—Very similar to *mimeticus*, but rather smaller; [pale spot at middle of costa often larger, and in any case almost invariably involving vein 1]; vein 3 usually entirely dark scaled, though occasionally there is a small [or large] pale area in the middle of that vein (especially in ♀). [Vein 5 (with 5.2) entirely dark, as in *mimeticus*.] Some specimens of var. *mimuloides* of *mimeticus* are intermediate, both in wing-markings and in structure of ♂ hypopygium, between typical specimens of the two species.

♂.—*Hypopygium* (fig. 94, **g**): *lp* very similar to that of *vishnui* (compare figs. 93, **e**, & 94, **g**), [with 5–6 curved teeth arranged like the spread fingers of a hand, and for the most part directed backwards; above the base of this group of teeth is a cluster of small denticles. Basal arm of paraproct considerably longer than in *mimeticus*; style broader].

LARVA † (fig. 97, **d–g**,).—Resembles *mimeticus* in general appearance, but differs as follows ‡:—Subapical bristles on antenna slightly nearer tip of shaft. Teeth of mentum less regular in size. Comb-teeth with more regular fringe, terminal point scarcely differentiated from fringe. Siphon with 5–6 pairs of short branched hairs along posterior border, which are little, if any, longer than diameter of siphon in middle (instead of 8–10 unpaired and much longer branched hairs), and one pair of short lateral branched hairs. Pecten-teeth stouter, with stronger lateral denticles; *lh* with about 3 short branches. Siphon variable in length (as shown in fig. 97, **g**), 6–9 times length of diameter at base.

DISTRIBUTION.—Fairly common from UNITED PROVINCES (Dehra Dun) to ASSAM and BURMA, and through PENINSULAR INDIA to CEYLON.

Known also from the MALAYAN REGION to NORTH AUSTRALIA and HONG KONG.

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* Edwards 1924, p. 394; Barraud 1924 *e*, p. 993; Brug 1924 *b*, p. 11; Borel 1926, p. 86.

† Barraud 1923 *c*, p. 942; Borel 1926, p. 87; Senior-White 1927, p. 71.

‡ [Specimens in the British Museum from Ceylon and Hong Kong agree fairly closely with Barraud's description and figures. Those from the latter locality were obtained in 1933 by Dr. R. B. Jackson, together with *C. mimeticus* and a third form of this group, described as new in the Appendix.]

238. **Culex (Culex) nilgiricus** Edwards, 1916.

Bull. Ent. Res. vi, p. 358 (♂ & ♀). TYPE-LOC.: Ootacamund, Nilgiri Hills, South India, 7,500′, xii. 1913 (*Fletcher*). TYPE: ♂ & ♀ in Brit. Mus.

ADULT *.—The original description is as follows (the words in square brackets are mine):—

" Male and female.—*Head* with dark brown upright scales; creamy white flat and narrow curved ones at the sides and in the middle respectively; the whitish more numerous in proportion to the dark brown ones in the male than in the female, and the flat ones extending higher up; the flat ones tend to form a line round the upper part of the eye margins, but in neither sex do they actually reach the middle line. A row of dark bristles round the eyes, of which a pair on the vertex are much longer than the others, at least in the female. Palpi and proboscis entirely black scaled in both sexes; male palpi longer than the proboscis by their terminal joint; basal segment without any row of projecting scales, but with some pale shortish hairs and with a few long dark ones towards the tip; second and third joints with numerous dark long hairs, the second nearly five times as long as the labella, the third about one quarter longer than the second. *Thorax*: prothoracic lobes reddish brown, apparently without scales; scutum (mesonotum) reddish brown, slightly pruinose, clothed with reddish brown scales; scutellum pale, almost whitish, clothed with narrow pale brown scales; postnotum light reddish brown. Pleuræ almost uniformly pale, unscaled. *Abdomen* blackish brown above, the segments with white basal bands of even width, broader in the male than in the female; venter almost uniformly pale. *Male genitalia*: side-pieces [coxites] of the usual *Culex* form without special modification, leaf-like appendage very narrow. Claspers moderate, smooth, gently curved, rather abruptly narrowed a short distance before the tip (as in *Culiciomyia*), a single fine hair arising from the point of narrowing. Unci [parameral plates] with pointed tips. Harpagones [lateral plates of the phallosome] apparently undivided, but provided with a rather long, pointed, downwardly extending projection, somewhat jagged on its lower edge (as in *Culiciomyia*). Harpes [para procts] short and broad, without basal projection, their tips broad and provided with shorter and less numerous spines than usual. *Legs* dark scaled, the under sides of the femora lighter; claws of the four anterior legs of the male each with a well-marked tooth. *Wings* rather thinly clothed with dark scales, those in the lateral series linear, few in number, except towards the tip of the wing. Fork-cells very long, yet scarcely twice as long as their stems, the upper with its base slightly nearer the apex of the wing than that of the lower. Cross-veins separated by about twice their own length. Halteres light brown.

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* Barraud 1924 *g*, p. 1272. [This species is still only known from the type ♂ and ♀. It is somewhat out of place in the subgenus *Culex*, as in spite of the absence of erect translucent scales on the ♂ palpi and of a subapical spiny crest on the ♂ style, it obviously has more affinity with the subgenus *Culiciomyia*, agreeing with the Indian species of that subgenus in form of phallosome and absence of scales on pleuræ. It is quite distinct from any of the species included by Barraud in *Culiciomyia*, approaching most nearly to *C. bailyi*.]

"Length of body, 6 mm.; male wing, 4·5 mm.; female wing, 5 mm. Madras: Utakamand [Ootacamund], Nilgiri Hills, 7,500 ft., 24th–31st December, 1913 (*T. Bainbrigge Fletcher*)."

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

239. **Culex (Culex) theileri** Theobald, 1903.

M.C. iii, p. 187 (♂ & ♀). TYPE-LOC.: Pretoria, Transvaal, S. Africa (*Theiler*). TYPE: ♂ & ♀ in Brit. Mus.

Culex pettigrewi Theobald, 1910, Rec. Ind. Mus. iv, p. 15 (♀). TYPE-LOC.: Ukrul, Manipur, 6,400′, Assam, viii. 1908 (*Pettigrew*). TYPE: ♀ in Ind. Mus.

Culex tipuliformis Edwards (nec Theobald), 1912, Bull. Ent. Res. iii, p. 31.

ADULT *.—A rather large brown species with conspicuously striped femora and tibiæ; abdominal tergites with triangular yellowish basal bands and usually with two pale spots or scattered pale scaling in middle of each tergite in addition. Wing about 5 mm.

♀.—*Head*: vertex and nape covered with narrow pale brown scales and numerous upright scales. Palpi black, with white scales apically. Proboscis brown, with median pale area beneath and at sides, but not forming a definite pale band. *Thorax*: mesonotum covered with narrow brown scales; a pair of submedian dark bare lines running back from the front, narrowing posteriorly; some narrow brown scales on upper part of *ppn* and on scutellum. Pleuræ with a line of broad pale scales along posterior border of sternopleura, and one large or two small patches on mesepimeron. *Wings*: dark scaled; c.-v. 4–5 only slightly nearer base of wing than 3–4. *Legs*: fore femur yellowish dorsally for whole length, anterior surface with a median longitudinal

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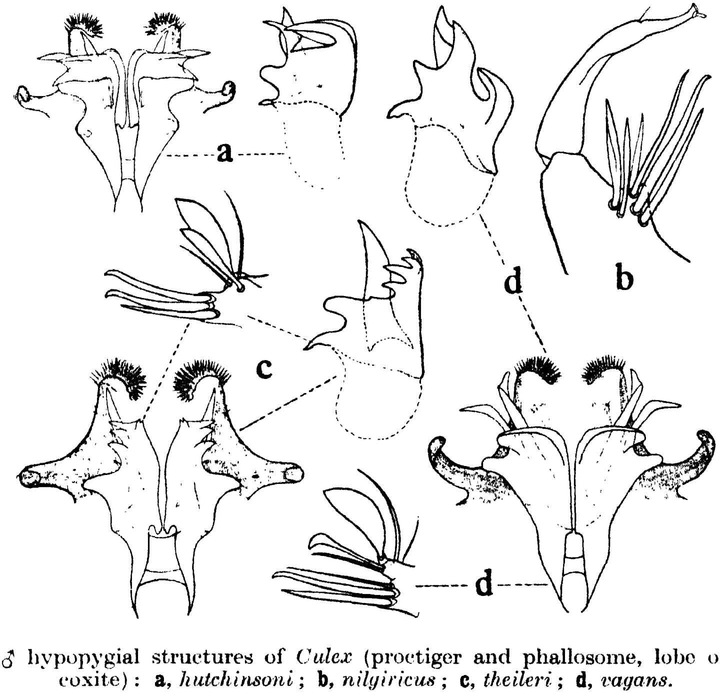
* Edwards 1911, p. 262; 1921 *c*, p. 339 (*tipuliformis*); 1926 *b*, p. 637; Barraud 1924 *g*, p. 1266; Kirkpatrick 1925, p. 115 (*tipuliformis*); Bedford 1928, p. 971; Martini 1931, p. 384.

dark brown stripe, a narrower white line ventrally, posterior surface pale, except for a narrow ventral dark brown line; mid-femur, seen from front, brownish-black, with a median longitudinal pale stripe, posteriorly almost entirely pale; hind femur dark dorsally from base nearly to knee, tip pale, basal ½ or more of anterior surface otherwise pale, a brown line ventrally along apical ⅓ or more. All tibiæ with pale line anteriorly, entirely pale posteriorly. Tarsi without pale rings, but segment 1 usually faintly striped with pale scaling.

Fig. 98.



♂ hypopygial structures of *Culex* (proctiger and phallosome, lobe of coxite): **a**, *hutchinsoni*; **b**, *nilgiricus*; **c**, *theileri*; **d**, *vagans*.

Abdomen: tergites brownish-black, with triangular yellowish basal bands, wider in middle than at sides, usually a pair of pale spots or scattered pale scaling, or both, in middle of each tergite in addition.

♂.—Palpi longer than proboscis by only about length of last segment; long segment with narrow pale ring on basal ½, and a patch of pale scales on outer side near apex, not forming a definite ring; tip of long segment and last two segments with outstanding dark hairs; penultimate segment with some pale scales on outer side near base ; last two segments with a line of white scales beneath. Proboscis brown, paler on apical ½. Other markings as in ♀. *Hypopygium* (fig. 98, **c**) : appendage of subapical lobe of coxite, *lp*, and paraproct as shown.

LARVA * (fig. 99, **a**–**f**).—*Antenna* as shown in fig. 99, **a** ; dark brown on apical ½ and at base, remainder pale. Mentum as in fig. 99, **b**. *Comb* of about 30 teeth in a triangular patch ; individual teeth comparatively long, with a terminal point and lateral fringe. *Siphon* widest at base and slightly tapering to tip, 4½–5½ times length of diameter at base ; usually uniformly pale, but with dark ring at base, and occasionally basal ½ is darkened. Usually 5 pairs of rather stout branched hairs along posterior border of tube, and one small pair of lateral 2-branched hairs. Pecten of 7–10 large curved teeth, those furthest from base more widely spaced than others ; 3–4 lateral denticles at base of each tooth. *Anal segment* with its hair and papillæ as shown in fig. 99, **c**.

HABITAT.—Large ground-pools, stream-pools, and marshes.

DISTRIBUTION.—Common in WESTERN HIMALAYAS, KASHMIR, PUNJAB, NORTH-WEST FRONTIER, and BALUCHISTAN. Less common to the east, but occurs in ASSAM hills and BURMA (Northern Shan States, *Senior-White*). It has been recorded from 9,500′, in HINDU KUSH mountains (*Wall*).

It has a wide distribution in the Mediterranean region, extending to ATLANTIC ISLANDS westwards, and through MESOPOTAMIA to PERSIA eastwards. Also known from EAST and SOUTH AFRICA.

240. **Culex (Culex) vagans** Wiedemann, 1828.

Aussereurop. Zweifl. Ins. i, p. 545 (♀). TYPE-LOC. : Foochow, China. TYPE : ♀ in Vienna Museum may be the type.

Culex tipuliformis Theobald (nec Edwards), 1901, M.C. ii, p. 325 (♀). TYPE-LOC. : Bakloh, Western Himalayas (*Lindesay*). TYPE : ♀ in Brit. Mus.

Culex virgatipes Edwards, 1914, Bull. Ent. Res. v, p. 126 (♂ & ♀). TYPE-LOC. : Hong Kong (*Macfarlane*). TYPE : ♂ in Brit. Mus.

ADULT †.—Resembles *theileri* fairly closely, but usually rather smaller (wing 4–4·5 mm.) ; hind femur entirely pale ventrally from base to knee on outer side ; abdominal tergites

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* Bedford 1919, p. 741 (*tipuliformis*) ; Edwards 1921 *c*, p. 340 (*tipuliformis*) ; 1926 *b*, p. 637 ; Séguy 1924, p. 40 (*tipuliformis*) ; Barraud 1924 *m*, p. 429 ; Kirkpatrick 1925, p. 117 (*tipuliformis*) ; de Meillon 1928, p. 321 ; Martini 1931, p. 385.

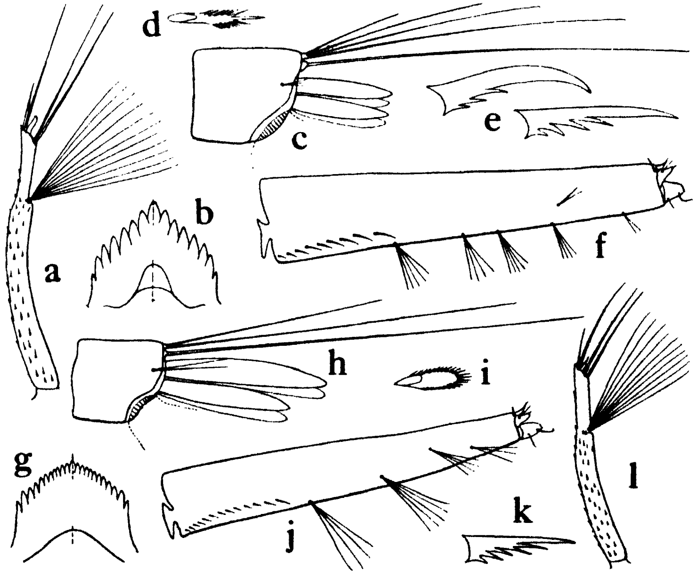
† Edwards 1921 *c*, p. 341 (*virgatipes*) ; 1922 *c*, p. 278 (*virgatipes*) ; 1922 *d*, p. 473 ; 1926 *b*, p. 640 ; Barraud 1924 *g*, p. 1269 (*tipuliformis*), Martini 1931, p. 391.

dark except for moderately wide creamy basal bands, which are not produced in middle; mesonotal scales rather more reddish-brown; c.-v. 4–5 more separated from 3–4 than in *theileri*. Palpi of ♂ longer than proboscis by about 1½ times length of terminal segment.

The winter form of this species occurring in Western Himalayas is often darker both in adult and larval stages than is usual.

♂.—*Hypopygium* (fig. 98, **d**): *lp* differing in shape from that of *theileri*.

Fig. 99.



Larval structures of *Culex*: **a**–**f**, *theileri*; **g**–**l**, *vagans*.

LARVA * (fig. 99, **g**–**i**).—Distinct from *theileri* in a number of characters (form of mentum, pecten-teeth, etc.), but very similar to *fatigans*, and apparently indistinguishable from larva of *pipiens* (a species not yet found in India). From larva of *fatigans* it differs in the following details:—*Siphon* rather longer, about 5 times length of diameter at base (instead of about 4 times); number of pecten-teeth 12–15 (in *fatigans* usually 10 or 11, but varies between 8 and 12); *lh* of 2 fairly long fine branches (in *fatigans* usually single and rather shorter); comb-teeth rather wider and more completely fringed than in *fatigans*; mentum of slightly different form, as indicated in figures. Hairs on siphon of fewer branches.

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* Barraud 1924 *m*, p. 430 (*tipuliformis*).

HABITAT.—Ground-pools, marshes, pools in beds of streams.

DISTRIBUTION.—Common in WESTERN HIMALAYAS, KASHMIR, and NORTH-WEST FRONTIER, and extending to PUNJAB and DELHI in the cold weather. It appears to be less common in EASTERN HIMALAYAS, but occurs in SOUTHERN and EASTERN CHINA and SIBERIA (Vladivostok).

241. **Culex (Culex) univittatus** Theobald, 1901.

M.C. ii, p. 29 (♂ & ♀). TYPE-LOC. : Durban, East Africa, ii. 1899 (*Christophers*). TYPE : ♂ & ♀ in Brit. Mus.

Culex perexiguus Theobald, 1903, M.C. iii, p. 199 (♂ & ♀). TYPE-LOC. : Sidon, Palestine (*Cropper*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT *.—A small pale brown mosquito resembling *vishnui* in size and general coloration, but distinguished by absence of pale bands on proboscis and tarsi and by white, not ochreous, basal bands on abdomen. Wing about 2·7 (♂)–3·5 mm. (♀).

♀.—*Head* : vertex with narrow pale brown scales ; upright pale scales on nape ; a patch of broad white scales low down each side. Palpi dark brown, with white scales at tips. Proboscis brown, without a pale band, but broadly and indistinctly pale in middle, beneath, and at sides. *Thorax* : mesonotum, scutellum, *apn*, and *ppn* covered with pale brown or pale golden narrow scales. Pleuræ with patches of broad white scales, [including a small but conspicuous postspiracular patch immediately behind prothoracic spiracle] ; one long lower mesepimeral bristle. *Wings* : dark scaled. *Legs* : brown, but extensively pale posteriorly and beneath ; femora with small pale knee-spots ; hind femur usually entirely pale, except for brown scaling along dorsal border towards apex (in some Indian specimens, and in African specimens, the brown scaling is more extensive) ; mid- and hind tibiæ with pale stripe on outer side ; hind tibia with a rather conspicuous white marking at apex. Tarsi without pale rings at joints. *Abdomen* : tergites dark brown, with narrow basal white bands (not ochreous as in many other species) and wider lateral patches not usually visible in dorsal view. Sternites pale.

♂.—Palpi longer than proboscis by rather more than length of last segment ; long segment light in colour and without any distinct pale rings, tip of that segment and last two segments with outstanding dark hairs ; last two segments with a line of white scales on underside. *Hypopygium* (fig. 100, **a**): ventral cornu of *lp* simple, but with a small spine-like process on ventral border; lateral process narrow, fairly long and pointed; median process large and pointed. Paraproct with long basal arm.

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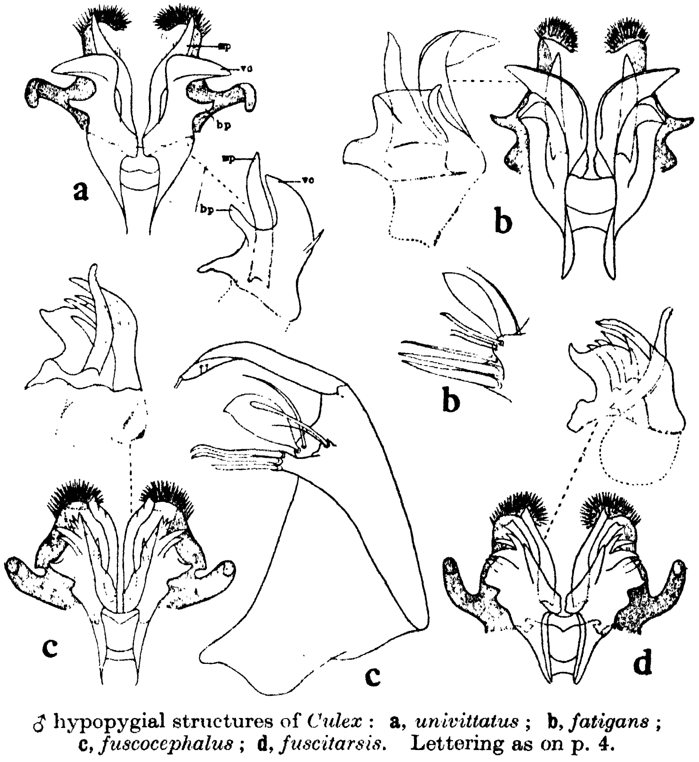
* Edwards 1911, p. 262 ; 1912, p. 32 ; 1914 *b*, p. 67 ; 1921 *c*, p. 342 (*perexiguus*) ; 1922 *b*, p. 85 ; 1926 *b*, p. 642 ; Barraud 1924 *g*, p. 1263 (*perexiguus*) ; Kirkpatrick 1925, p. 125 (*perexiguus*) ; De Meillon 1928, p. 321.

LARVA * (fig. 101, **b**): very similar to *tritæniorhynchus*, *barraudi*, and *fuscocephalus*. Differs from the first-named as follows:—Antennal tuft at about $\frac{3}{4}$ from base, instead of at about $\frac{2}{3}$; 5 pairs of branched hairs on siphon, of which two are more or less lateral, instead of 6 pairs of which one is lateral; *lh* with shorter branches.

Fig. 100.



♂ hypopygial structures of *Culex*: **a**, *univittatus*; **b**, *fatigans*; **c**, *fuscocephalus*; **d**, *fuscitarsis*. Lettering as on p. 4.

Differs from *barraudi* in having 5 pairs of branched hairs on siphon, of which two are lateral, instead of 4 pairs of which one is lateral; teeth of mentum all about same size and regular.

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* Edwards 1921 c, p. 343; 1926 *b*, p. 643; Barraud 1924 *m*, p. 431; Séguy 1924, p. 38; Kirkpatrick 1925, p. 128; Galliard 1927, p. 99 (all as *perexiguus* except Edwards 1926). The larva figured as *C. univittatus* by Ingram and Macfie (1919, p. 68) is *Aëdes* (*Aëdimorphus*) *ochraceus* Theo.

Differs from *fuscocephalus* in number and arrangement of branched hairs on siphon, in length of siphon, which is about 7 times length of diameter at base (instead of 4½–5 in *fuscocephalus*), and in form of *lh*.

HABITAT.—Marshy pools, borrow-pits, stagnant drains and canals, shallow wells; less frequently in domestic collections of water and rice-fields.

DISTRIBUTION.—NORTH-WEST FRONTIER: Shahgai *, Peshawar dist., vii. 1929. BALUCHISTAN: Quetta * (*Davys*). SIND: Larkana * (*Baily*). PUNJAB: Amritsar and Mahdopur, iv. 1921 (*Barraud*); Lahore *, ix. 1923 (*Sinton*). UNITED PROVINCES: Saharanpur *, 1926 (*Sinton*).

Also known from MEDITERRANEAN REGION, AFRICA, and MADAGASCAR.

242. **Culex (Culex) fatigans** Wiedemann, 1828.

Aussereurop. Zweifl. Ins. i, p. 10 (♂ & ♀). TYPE-LOC.: East Indies. TYPE: Vienna Mus. (?).

Culex cingulatus Doleschall, 1856, Nat. Tijd. v. Ned.-Ind. x, p. 405. TYPE-LOC.: Java. TYPE: non-existent.

Culex doleschallii Giles, 1900, Handbook, p. 338, nom. nov. for *C. cingulatus* Dol.

Culex quasipipiens Theobald, 1901, M.C. ii, p. 136 (♀). TYPE-LOC.: Sambalpur, Orissa (*Murphy*). TYPE: ♀ in Brit. Mus.

Culex fouchowensis Theobald, 1901, M.C. ii, p. 137 (♂ & ♀). TYPE-LOC.: Fou Chow, China (*Rennie*). TYPE: ♂ & ♀ in Brit. Mus.

Culex reesii Theobald, 1901, M.C. ii, p. 145 (♂ & ♀). TYPE-LOC.: Hong Kong (*Rees*). TYPE: probably non-existent.

Culex sericeus Theobald, 1901, M.C. ii, p. 147 (♀). TYPE-LOC.: Hong Kong (*Rees*). TYPE: probably non-existent.

Culex albolineatus Giles, 1901, Journ. Bomb. Nat. Hist. Soc. xiii, p. 609 (♀). TYPE-LOC.: Shahjahanpur, United Provinces, India, x. 1900 (*Giles*). TYPE: ♀ in Brit. Mus.

Culex christophersi Theobald, 1907, M.C. iv, p. 453 (♂ & ♀). TYPE-LOC.: India (*Christophers*). TYPE: ♂ & ♀ in Brit. Mus.

Culex minor Theobald, 1908, Rec. Ind. Mus. ii, p. 298 (♂ & ♀). TYPE-LOC.: Lushai Hills, Assam (*Macleod*) (♂); Sylhet, Assam (*Hall*) (♀). TYPE: ♂ & ♀ in in Ind. Mus. (examined by Author).

ADULT †.—Usually recognizable by dark tarsi and (in ♀) somewhat rounded abdominal bands. Wing about 3·5 (♂)–4·5 mm. (♀).

♀.—*Head*: vertex and nape covered with narrow golden-brown scales and scattered upright scales, latter more numerous on nape, a patch of broad pale scales low down at each side. Palpi brown, about ⅛ length of proboscis; latter dark brown, usually with an indistinct paler area about the middle, especially on underside and sides; labella pale brown. *Thorax*: mesonotum, scutellum, *apn*, and *ppn* covered with narrow golden-brown scales. From front of mesonotum two submedian dark bare lines run back a short distance, narrowing posteriorly. Pleuræ brown, with two patches of broad pale scales on mesepimeron and two on sternopleura, [none on postspiracular area]. No definite dark areas. *Wings*: dark scaled, outstanding scales narrow. *Legs*: brown, dark brown,

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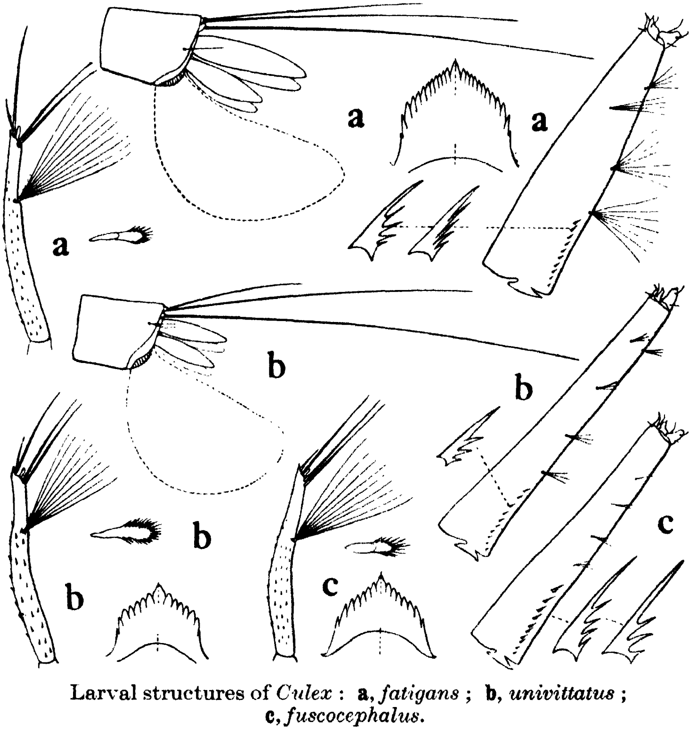
† Theobald 1901 *b*, p. 151; Edwards 1913 *a*, p. 55; 1921 *c*, p. 345; 1924 *b*, p. 395; 1926 *a*, p. 141; 1926 *b*, p. 645; Barraud 1924 *g*, p. 1264; Brug 1924 *b*, p. 9; Borel 1926, p. 98; Martini 1931, p. 364.

Fig. 101.



Larval structures of *Culex*: **a**, *fatigans*; **b**, *univittatus*; **c**, *fuscocephalus*.

or nearly black when viewed from front or from above; paler, especially femora, when seen from behind or from beneath; hind femur dark brown on dorsal border on outer side, otherwise pale; femora with very small knee-spots, hardly visible, except on hind pair. Mid- and hind tibiæ usually marked with a narrow yellowish ring at apex. Tarsi entirely dark. *Abdomen*: tergite I almost entirely covered with long yellow hairs, a patch of dark scales on apical border in middle; II–VII dark brown or black, with transverse ochreous (not white) basal bands, a little wider in middle than laterally, lateral borders of VI and VII, and usually whole of VIII, pale scaled. Sternites entirely covered with pale scaling.

♂.—Palpi longer than proboscis by rather less than length of terminal segment; long segment with narrow pale ring on basal ½, and usually with a rather wide indefinite pale area near apex; apical ⅓ of long segment and last two segments with outstanding dark hairs; a line of white scales on under surface of penultimate segment; a spot of white scales at base of terminal segment on underside. Pale abdominal bands usually wider than in ♀.

Variation.—Specimens from Assam Hills (Shillong) have darker mesonotal scaling than usual and pleuræ are very dark greenish-brown or black. In some Western Himalayan examples one or more basal pale bands on abdomen are triangular, and dark parts of tergites may be greyish-brown, with or without a pair of indistinct lighter spots. Giles's type of *C. albolineatus* has somewhat this type of colouring.

♂.—*Hypopygium* (fig. 100, **b**): *lp* very characteristic. Paraproct usually with a small lateral arm.

LARVA * (figs. 101, **a**, & 102).—Head, antenna, mentum, siphon, and anal segment as shown in fig. 101, **a**. [Thoracic chætotaxy † as shown in fig. 102.] Comb of 35–40 small fringed teeth in a triangular patch. Siphon usually about 4 times length of diameter at base. Distinguished from *vagans*, which it closely resembles, as mentioned on p. 417.

HABITAT.—Domestic collections of water and in such places as flooded open cement drains, flooded latrines, overflow water from houses, kitchens, etc. Also in ground-pools, ditches, and shallow wells. Rarely in tree-holes or bamboos;

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* Christophers 1906, p. 7; Barraud 1924 *m*, p. 430; Borel 1926, p. 100; Senior-White 1927, p. 71; Buxton & Hopkins 1927, p. 83; Martini 1931, p. 365. *Pupa*: Christophers 1906, p. 7; Ingram & Macfie 1917 *a*, p. 84; Buxton & Hopkins 1927, p. 80. *Egg*: Buxton & Hopkins 1925, p. 295.

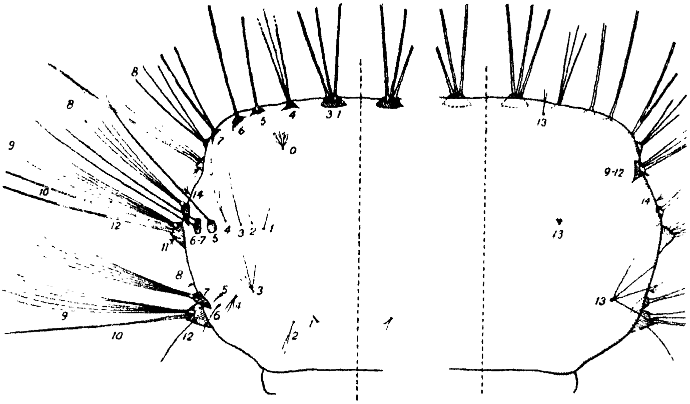
† [The thoracic chætotaxy of *C. fatigans* is illustrated for comparison with *Tripteroides* (fig. 9) and *Aëdes* (fig. 39). Several other species of *Culex* examined are closely similar, and the arrangement shown may be taken as typical of the genus. The notation adopted is the same as for the other genera. Noteworthy points are:—*Prothorax*: the pair of plates surrounding bases of hairs 1–3 are more conspicuous than in *Aëdes* or *Tripteroides*, and are much closer together than in *Aëdes*; hair 8 is as well developed as 7, and its base is just visible from above; 9–12 are latero-ventral in origin; hair 14 absent. *Mesothorax*: arrangement much as in the other two genera; hairs 6–7 arising from a common plate, 8 large, 13 and 14 very small. *Metathorax*: arrangement much as in the other two genera; hairs 1–6 all small; 7 large, 8 very small, these two (as in *Aëdes*) resembling in size and position hairs 8 and 14 of mesothorax; 11 apparently absent; 13 fairly well developed.]

not in jungle-pools, 'stream-pools, etc., if far from human habitations.

Distribution.—One of the most abundant of Indian Culicini. Found in all parts of the Indian region, and is largely a domestic mosquito. It occurs up to 5,000′ or more in the hills. In parts of the country it is most probably concerned in the transmission of filariasis.

It is common in the tropics and subtropics of both New and Old Worlds.

Fig. 102.



Chætotaxy of larval thorax of *Culex fatigans* : left, dorsal right, ventral.

243. Culex (Culex) hutchinsoni Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1261 (♂ & ♀). Type-loc. : Nongpoh, Khasi Hills dist., Assam, vii. 1922 (*Barraud*). Type : ♂ & ♀ in Brit. Mus.

Adult.—A very small dark brown mosquito having some resemblance to *tritæniorhynchus*, but proboscis not definitely banded, tarsi entirely dark, and ♂ hypopygium of very different form. Wing 2·6–3 mm.

♀.—*Head* : very similar to that of *fuscocephalus* ; a mixture of golden-brown and pale narrow-curved scales on vertex, with scattered upright scales, more numerous upright scales on nape ; a patch of broad white scales low down each side. Palpi brown, with a few pale scales apically. Proboscis brown, paler ventrally, except at extreme base and tip, pale scales at sides, and a sprinkling of pale scales on middle $\frac{2}{3}$ of upper surface, not forming a definite band. *Thorax* : mesonotum, scutellum, *apn*, and *ppn* clothed with narrow brown scales of a deep golden tint. Pleuræ apparently entirely dark, with one or two patches of white scales; one lower mesepimeral bristle. *Wings*: dark scaled, outstanding scales long and narrow. *Legs*: dark brown, with a pale sheen when seen from certain angles; fore and mid-pairs paler posteriorly, especially femora. Hind femur pale, except along dorsal border. Hind tibia with narrow pale ring at apex. Tarsi entirely dark. *Abdomen*: brownish-black, with narrow basal pale bands and wider lateral patches. Venter pale yellowish.

♂.—Palpi longer than proboscis by a little more than length of terminal segment, deep brown except for a rather broad pale-scaled area on apical ½ of long segment; last two segments and tip of long segment with outstanding dark brown hairs, a few light scales on ventral surface of penultimate segment, not forming a conspicuous line. Proboscis dark brown, with paler scaling forming an indefinite and inconspicuous band nearer apex than base. Otherwise ♂ resembles ♀, except for plumose antennæ. *Hypopygium*: ventral cornu of *lp* divided into three pointed projections, lateral process moderate, median process long and pointed; proctiger with long basal arm.

LARVA.—Unknown.

HABITAT.—Road-side pools.

DISTRIBUTION.—Known only from type-locality.

244. **Culex (Culex) fuscocephalus** Theobald, 1907.

M.C. iv, p. 420 (♀). TYPE-LOC.: Peradeniya, Ceylon (*Green*). TYPE: ♀ in Brit. Mus.

Culex uniformis Leicester, 1908, Cul. Malaya, p. 159 (♀). TYPE-LOC.: Batu Gajah, Malay Penin. (*Leicester*). TYPE: ♀ in Brit. Mus.

Culex minimus Leicester, 1908, Cul. Malaya, p. 160 (♂ & ♀). TYPE-LOC.: Kuala Lumpur, Malay Penin. (*Leicester*). TYPE: non-existent.

Culex taytayensis Banks, 1909, Phil. Journ. Sci. iv, p. 545 (♂ & ♀). TYPE-LOC.: Rizal, Taytay, Philippine Is. TYPE: ♂ & ♀ no. 11549 in Bureau of Sci., Manila.

Culex luteola Theobald, 1910, M.C. v, p. 378 (♀). TYPE-LOC.: Peradeniya, Ceylon (*Green*). TYPE: ♀ in Brit. Mus.

Culex inelegans Dyar, 1920, Insec. Insc. Mens. viii, p. 179 (♂ & ♀). TYPE-LOC.: Los Banos, Philippine Is., vi. 1915 (*Baker*). TYPE: ♂ no. 23719 in U.S. Nat. Mus.

ADULT *.—Recognized by its general dull brown colour and unbanded abdomen, and by presence of two horizontal dark bands on pleuræ divided by a white-scaled band. Wing about 3 mm.

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* Edwards 1913 *b*, p. 234 (syn.); Barraud 1924 *g*, p. 1270; Borel 1926, p. 101.

♀.—*Head*: vertex covered with a mixture of brown and white narrow scales and upright scales, latter more numerous on nape; a patch of broad white scales at each side. Head when viewed from front appears to be almost entirely covered with pale scales on a dark ground; from above vertex appears dark, with a conspicuous white area on each side. Proboscis brown, pale beneath, especially on apical ½. Palpi brown. *Thorax*: mesonotum uniformly clothed over largest part with dark brown scales; paler scales in front of scutellum, and some very light-coloured scales on front margin behind head. Scutellum, *apn*, and *ppn* with narrow pale brown scales. A broad line of white scales from *apn* across pleuræ to middle of mesepimeron; integument both above and below this line brownish-black and without scales, except for a patch of white scales around lower sternopleural bristles; one or two lower mesepimeral bristles. *Legs*: dark brown when seen from front or from above, paler beneath; hind femur mainly pale, with brown scales along dorsal border towards apex. Hind tibia with more or less defined pale stripe on outer side. Tarsi brown. *Abdomen*: dusky brown dorsally; posterior borders of tergites with pale hairs, giving a somewhat banded appearance; lateral margins of tergites with pale scales extending from base nearly to hind margin, not usually visible dorsally. In some specimens there are a few pale scales at base of several segments in middle, not forming definite transverse bands. Sternites entirely pale scaled.

♂.—Palpi longer than proboscis by rather more than length of last segment; long segment with very narrow pale ring on basal ½, and some pale scaling along outer side towards apex; last two segments and apical ⅓ of long segment with outstanding dark hairs; penultimate segment with a line of white scales beneath. *Hypopygium* (fig. 100, **c**): *lp* with a number of teeth and moderately long median process. Paraproct with long basal arm, and an extension of the plate just above this.

LARVA * (fig. 101, **c**).—Head and antenna, mentum, siphon, etc., as shown in figures. Very similar to *barraudi*, *tritæniorhynchus*, and *univittatus*, differing from the first-named in shape of mentum, in having antennal tuft at ⅔ of length of shaft from base (instead of ⅝–¾), and in having usually 10 or 11 comparatively large pecten-teeth. Differs from the other two species mentioned above chiefly in number and arrangement of branched hairs on siphon, size of pecten-

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* Barraud 1924 *m*, p. 432; Borel 1926, p. 103; Senior-White 1927, p. 71.

teeth, and in form of lateral hair of anal segment. Siphon usually about 5 times length of diameter at base.

HABITAT.—Ground-pools, rice-fields, etc.

DISTRIBUTION.—Widely distributed in India from north-west PUNJAB (Jhelum) to ASSAM, BURMA, and ANDAMAN Is., and through PENINSULAR INDIA to CEYLON.

Known also from MALAY PENINSULA, SIAM, COCHIN CHINA, and DUTCH EAST INDIES as far south-east as TIMOR, PHILIPPINE Is., and SOUTH CHINA.

245. **Culex (Culex) fuscitarsis** Barraud, 1924.

Ind. Journ. Med. Res. xi, p. 1272 (♂ & ♀). TYPE-LOC. : Pachmarhi, Central Provinces, India, vii. 1915 (*Dowson*). TYPE : ♂ & ♀ in Brit. Mus.

ADULT.—A small dusky-brown mosquito resembling *fuscocephalus*, and possibly only a variety of that species, differing in having pale ochreous basal bands on the abdomen (narrow in ♀, wider in ♂). There are also slight differences in the structure of ♂ hypopygium. The head also appears darker on vertex and the lateral white areas are less evident. Wing about 3 mm.

♂.—*Hypopygium* (fig. 100, **d**) : paraproct without the pronounced expansion above basal arm which is present in *fuscocephalus* ; otherwise structure is very similar.

LARVA.—Unknown.

HABITAT.—Ground-pools, river-pools, and swamps.

DISTRIBUTION.—CENTRAL PROVINCES : Pachmarhi *, type-locality, as given above ; Padreganj *, Seoni dist., and Kukra Kapa *, Satpuras, vii. 1931 (*Senior-White*). CENTRAL INDIA : Ghunghtui *, Rewa State, vii. 1931 (*Senior-White*). ORISSA : Ranchi *, viii. 1922 (*Fletcher*) ; Noamundi *, Singhbhum dist., viii. 1929 (*Senior-White*). DELHI PROVINCE : Delhi *, between old city and Jumna River, viii. 1927 (*Senior-White*). BOMBAY PRES. : Poona * and Lonavla *, xi. 1928 (Dist.-Surg. G.I.P. Rlwy.). MADRAS PRES. NORTH : Ambadola *, Vizagapatam Agency (*Sinton*).

Not known from elsewhere.

APPENDIX.

BY F. W. EDWARDS, M.A., Sc.D.

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I. CHARACTERS AND AFFINITIES OF THE CULICIDÆ.

The family Culicidæ is a well-circumscribed group of Nematocerous Diptera which may be defined as follows :—

Small, or smallish, slenderly-built flies, ranging from 3–10 mm. in length of body. Antennæ composed of 15–16 segments *, the first vestigial, forming a narrow ring, the second segment, or torus, more or less conspicuously enlarged. Ocelli absent. Thorax with pronotum divided in middle ; mesonotum without any suture dividing the præscutum from the scutum ; postnotum, or mesophragma, well developed, but metanotum reduced to a narrow strip. Abdomen with eight distinct segments, apart from the genital and anal segments. Legs long and slender ; tibiæ without distinct spurs †. Wings with a uniform type of venation ‡ : vein *Sc* long and ending in costa ; vein 2 forked ; 3 simple ; 4 forked ; 5 forked ; 7 absent or represented by an indefinite fold in the membrane ; cross-veins 3–4 and 4–5 both present.

Pupa aquatic and free-swimming. Prothoracic respiratory horn present and provided with a single opening. Leg-sheaths coiled, so that they do not project beyond the short wing-cases. No strong spines on thorax and no rows of spines on abdomen.

Larva aquatic, with well-developed head-capsule and long antennæ. Only one pair of spiracles present, dorsally placed on abdominal segment IX §.

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* Except in one species of *Chaoborus*, in which the antennæ are reduced.

† Very small tibial spurs are present in some Chaoborinæ, otherwise spurs are absent.

‡ The only genus to which this definition will not apply in its entirety is the New Zealand *Neodixa*, in which the venation is reduced.

§ Spiracles absent or closed in some Chaoborinæ.

Some of the characters noted in the above definition are to be found equally in other groups, but a reference to the wing-venation will at once dispel any doubt as to whether a given insect belongs to the family Culicidæ or not; all members of this family, and none of any other, have veins 2 and 4 forked (2-branched), while vein 3 is simple. Certain small Tipulidæ (genera *Geranomyia*, *Toxorhina*, and others) are provided with a long proboscis, and are sometimes mistaken for mosquitoes, but apart from the fact that the proboscis is very differently constructed and incapable of use as a biting organ, these Tipulidæ may be recognized by their more complex venation, vein 7 being present. The majority of the Chironomidæ resemble the mosquitoes in having the antennæ plumose in the male sex, but have the venation less complex, vein 4 being simple and cross-vein 4–5 often absent. The Ceratopogonidæ and Psychodidæ are less likely to be confused with the Culicidæ owing to their smaller size; moreover, in these also the wing-venation is quite different.

The pupæ of some Chironomidæ (notably those of *Tanypus* and related genera) are very similar to those of mosquitoes, having the same general form and habits, but differ in the structure of the respiratory horn, in having the paddles united basally (as is also the case in *Dixa* and *Corethrella*), and in abdominal chætotaxy, segments I–VI being largely bare, VII and VIII with a row of stiff bristles along each side, and each paddle with two similar lateral hairs.

The only other aquatic Dipterous larvæ which might conceivably be mistaken for Culicidæ are those of certain Psychodidæ which possess a somewhat similar respiratory siphon, but in these the form of the body and the cuticular armature is quite different, apart from more fundamental differences in head-structure. The larvæ of Chironomidæ differ very obviously in the absence of spiracles and presence of prothoracic and terminal abdominal prolegs; those of the comparatively few aquatic Tipulidæ in the incomplete head-capsule, bare body, and terminal instead of dorsal spiracles.

From a consideration of all the characters of all stages of their life-history it now appears certain that the nearest relatives of the Culicidæ are the Chironomidæ, and that the Ceratopogonidæ and Simuliidæ, though rather less closely connected, belong to the same stock; the other families of Nematocera (Tipulidæ, Psychodidæ, Mycetophilidæ, etc.) have comparatively little in common with the Culicid group. Among the adult characters common to the four families of this group may be mentioned: (1) the reduction of the first antennal segment—not seen in other families; (2) absence of ocelli; (3) resemblances in structure of the thoracic pleuræ, *e. g.*, in the presence of a large membranous area behind the prothoracic spiracle. The difference in venation between the Culicidæ and the other three families, though great, is, perhaps, not so fundamental as might be supposed, as it is not difficult to show how the venation of the Chironomidæ might have been derived from that of the Culicidæ by a process of reduction and slight modification.

Another point in which the four families Culicidæ, Chironomidæ, Ceratopogonidæ, and Simuliidæ are alike is in having the legs of the pupa coiled and tucked under the wing-cases ; in all other families of Nematocera the tarsal sheaths are straight and project well beyond the wing-cases. It would seem that this modification of the pupa was in the first instance developed to allow freedom of movement of the abdomen so that the pupa might swim actively ; the fact that the modification has been retained in the inactive pupæ of Simuliidæ may, perhaps, be claimed as a further example of the irreversibility of evolution.

II.—The Indian Dixinæ and Chaoborinæ.

In order to complete the account of the Indian Culicidæ it seems desirable to include a brief description of the subfamilies Dixinæ and Chaoborinæ. The members of these subfamilies are not blood-suckers, and have no economic importance—except that flies of the genus *Chaoborus* are used by some African natives as food ; nevertheless, they are of great biological interest. As in the case of the mosquitoes (Culicinæ), all members of these groups are aquatic in their early stages. The larvæ of *Dixa* have some resemblances in structure and habits to those of *Anopheles*, and the two genera were at one time confused.

Subfamily *DIXINÆ*.

The genus *Dixa* was long regarded as constituting a distinct family of Nematocera, and was so treated by Brunetti in his volume on Diptera Nematocera in the ' Fauna of British India ' series. It is, however, undoubtedly related to the Culicinæ, and is best included in the family Culicidæ, forming a separate subfamily. Only two genera of the subfamily are known ; the second (*Neodixa*) may be disregarded here, as it is represented by a single known species from New Zealand.

The chief subfamily characters are the following :—

Adult.—Eyes widely separated and rounded. Mouthparts short, not adapted for biting ; palpi (in both sexes) incurved. Antennal flagellum of 14 segments (not 13 as in Culicinæ and Chaoborinæ), never plumose in ♂. *Wings* with venation similar in type to that of the other two subfamilies, but subcosta shorter, ending above or before base of sector ; sector oblique ; stem of upper fork strongly curved upwards. No scales, but only short hairs, on veins or in fringe. *Legs* without scales and not conspicuously hairy. *Hypopygium* of ♂ very varied in structure in the different species, but with coxite short and broad ; style without a terminal spine ; proctiger with distinct chitinisations (often elaborate), including a pair of hairy cerci or paraprocts ; phallosome various, usually complicated.

LARVA.—Differs from that of the other two subfamilies in the much more distinct segmentation of the thorax, which is little, if any, broader than the abdomen. Mouth-brushes present. Antennæ not prehensile, the spines at tip short and not movable. Fore gut communicating with mid-gut. Spiracular apparatus large, with functional spiracles but no siphon. Abdomen with a pair of ventral prolegs, surmounted by hooks, on each of the first two segments, and with pairs of ventral combs on segments VI and VII.

Genus **DIXA** Meigen, 1818.

Syst. Beschr. i, p. 218. Genotype, *D. maculata*, Meig.

Brunetti recorded five Indian species of this genus* ; one more has since been described by Senior-White, and several others are described below. All are rather small flies, with a wing-length of about 3–5 mm.

The genus is now divided into five subgenera, three of which do not occur in Europe or Asia, and, therefore, do not concern us here. The described Indian species all appear to belong to the subgenus *Dixa*, but one species of the subgenus *Paradixa* is represented in the British Museum by a specimen from Kashmir, described below as new. It is probable that many Indian species of both subgenera await discovery.

Key to Indian Species of Dixa.

1.	Wings with elaborate markings, including two large brown areas in upper basal cell	[p. 431. *maculipennis* Brun.,
	Wings less extensively marked	2.
2.	A brown or greyish spot (sometimes faint) in upper basal cell	3.
	No trace of dark spot in upper basal cell	6.

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* Brunetti brought his types to London in 1921, and I made some notes on them before they were returned to Calcutta, but some details of their structure remain undescribed.

3.	Wing-tip darkened; head yellow	*ochrilineata* Brun., [p. 434.
	Wing-tip not darkened; head dark	4.
4.	Grey markings present between veins 2 and 4 towards tip of wing	5.
	No such markings	sp. n. ?, pp. 433–4.
5.	A small grey spot towards end of lower basal cell	*montana* Brun., p. 433.
	No such spot	*trinotata*, sp. n., p. 432.
6.	Vertex and tori yellow; proboscis rather long	*zeylanica* Senior-White, [p. 434.
	Vertex and tori blackish; proboscis normal	7.
7.	Thorax almost uniformly blackish; a diffuse grey cloud over cross-veins	8.
	Thorax with yellowish ground-colour; a small brown spot over cross-veins	9.
8.	Upper fork-cell shorter then its stem	*christophersi*, sp. n., [p. 435.
	Upper fork-cell longer than its stem	*platystyla*, sp. n., p. 436.
9.	First flagellar segment of antenna shorter, slightly thickened	10.
	First flagellar segment longer, cylindrical.	*kashmirensis*, sp. n., [p. 437.
10.	Spot over cross-veins reaching well into marginal cell	*bistriata* Brun., p. 435.
	Spot over cross-veins scarcely extending into marginal cell	*bifasciata* Brun., p. 435.

Subgenus **DIXA** Meigen, s. str.

Genotype, *Dixa maculata* Meigen (Europe).

ADULT.—Antennæ with first segment of flagellum slightly thickened towards middle, usually not more than about 4 times as long as broad. Hypopygium of ♂ with lobe at apex of coxite short or absent, style usually short and simple.

LARVA.—Antenna without hairs on inner side. Abdomen with a dorsal crown or rosette of stiff hairs on each of segments II–VII or III–VII. Apex of large lateral plate of spiracular apparatus without spur or tooth. Caudal projection rarely reaching beyond posterior border of spiracular apparatus.

So far as known, the larvæ of this subgenus live in running water.

1. **Dixa (Dixa) maculipennis** Brunetti, 1911.

Rec. Ind. Mus. iv, p. 266. TYPE-LOC.: Darjiling (*Brunetti*) and Matiana, Simla dist. (*Annandale*). TYPES: ♂ & ♀ in Ind. Mus.

ADULT.—Readily distinguished from other Indian species* by the conspicuously marmorated wings, the markings including two large dark brown spots completely crossing the upper basal cell and three crossing the marginal cell. Structural

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* The Chinese *D. guttipennis* Thomson is very similar, but has the markings in the upper half of the wing relatively smaller and those in the lower half relatively larger.

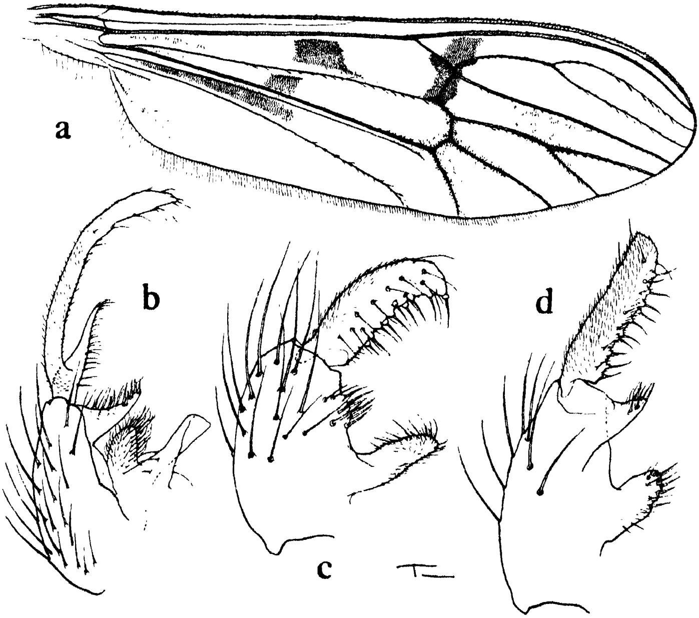
characters as in *D. montana* and related species : first flagellar segment moderately long but slightly thickened ; subcostal vein ending slightly before base of sector ; cerci of ♀ long and pointed. ♂ not available for description.

DISTRIBUTION.—Known from type-localities and from Ritani, Muktesar, 13. v. 1923 (*Fletcher*).

2. **Dixa (Dixa) trinotata,** sp. n.

ADULT ♂.—*Head* : dark above, clypeus pale yellowish, quite short. Antenna with scape dark brown (flagellum missing in type). Palpi dark. *Thorax* : mesonotum yellowish, with three separate dark brown stripes, median stripe not distinctly divided , no darkening on shoulders in front of lateral stripes ; scutellum dark at sides ; postnotum dark ; pleuræ mainly dark, pale on sutures ; pruinosity very slight. No sternopleural hairs. *Legs* : yellowish, including all coxæ ; femora and tibiæ narrowly but very distinctly black at tips. First hind tarsal segment with a pair of long hairs beneath near base. *Wings* (fig. 103, **a**) with three conspicuous brown

Fig. 103.



Wing of *Dixa trinotata*, sp. n. (**a**); coxite, with lobes, and style of ♂ hypopygium of *D. trinotata*, sp. n. (**b**), *D. christophersi*, sp. n. (**c**), and *D. platystyla*, sp. n. (**d**).

spots, one extending from vein 1 over the cross-vein, one in middle of upper basal cell, and one across middle of vein 5; in addition, with faint grey markings, as follows: a patch connecting veins 3 and 4, a broad border to vein 5.2, and a small area on hind border of wing at base. Subcosta ending distinctly before base of sector. Vein 4 with numerous small hairs beneath on its basal section, the hairs extending more than half-way from cross-vein to base of wing. *Hypopygium* (fig. 103, **b**): tergite simple. Cerci finger-like. Coxite small, with large basal lobe and finger-like apical lobe. Style long, slender, curved, with a short, pointed, basal arm.

DISTRIBUTION.—ASSAM: Shillong, 20. x. 1920 (*R. Senior-White*), 1 ♂, "in shade at Crinoline Falls," type in Brit. Mus., previously determined as *D. montana*.

In hypopygial structure this species appears to be intermediate between the subgenera *Dixa* and *Paradixa*; it also differs from most species of *Dixa* and resembles *Paradixa* in the absence of sternopleural hairs.

3. **Dixa (Dixa) montana** Brunetti, 1911.

Rec. Ind. Mus. iv, p. 265. TYPE-LOC.: Simla, 7,000′ (*Annandale*). TYPE: ♂ & ♀ in Ind. Mus.

ADULT.—Resembles *D. trinotata*, differing slightly in wing-markings; an irregular pale grey band extends from base of fork of vein 2 to base of fork of 4; an additional small grey spot present towards end of lower basal cell, and another similar spot opposite this below vein 5. Thorax rather darker, with some darkening on shoulders. In a ♀ in the British Museum the first antennal segment is rather long for a member of this subgenus, but slightly swollen towards base; ovipositor rather long, pointed. Hypopygium of ♂ type with style much shorter and broader than in *D. trinotata*.

LARVA (fig. 104, **e**)*.—As described by Baini Prashad from specimens from Kasauli this appears to be typical of the subgenus *Dixa*, but its specific identity requires confirmation, as there are, no doubt, several closely allied Indian species of this group.

DISTRIBUTION.—Simla district (*Annandale*); Murree, PUNJAB, 1922 (*C. A. Gill*).

4. **Dixa (Dixa)** sp.

ADULT ♀.—Resembles *D. trinotata* and *D. montana*, but differs slightly from both in wing-markings, and is probably specifically distinct. The three main spots of *D. trinotata* are distinguishable but very faint; spot over cross-vein completely filling area between sector and vein 1; a small faint grey cloud over base of fork of vein 2, but none between veins 3 and 4, and none over 5.2. Scutellum uniformly darkened. Antennæ, wing-venation, and ovipositor as in *D. trinotata.*

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* Baini Prashad 1918, p. 156.

DISTRIBUTION.—PUNJAB: Kasauli, 5000′, 6. iii. 1921 (*Barraud*), 1 ♀ in Brit. Mus.

5. **Dixa (Dixa)** sp.

ADULT ♀.—Much resembles the last, but wing-markings even more reduced, spot over cross-veins smaller and occupying only a small portion of the space between vein 1 and the sector.

DISTRIBUTION.—KASHMIR: Aran, 8,000′, 12. ix. 1930 (*Christophers*), 2 ♀♀ in Brit. Mus.

6. **Dixa (Dixa) ochrilineata** Brunetti, 1911.

Rec. Ind. Mus. iv, p. 267. TYPE-LOC.: Kurseong, Darjiling dist. (*Annandale*). TYPE: ♀ in Ind. Mus.

ADULT ♂.—*Head*: light yellow, including proboscis and tori. *Thorax*: yellow; mesonotum with three rather narrow and well-separated brown stripes, lateral stripes curved towards and over the sides anteriorly. *Legs*: yellowish, tips of femora black. *Wings* with a spot in upper basal cell as in *D. montana* and related species, but differing in having the whole tip darkened; a dark brown streak extending from vein 1 over the cross-veins and continued, though more faintly, over vein 5.2. Ovipositor small, inconspicuous, pale yellow.

DISTRIBUTION.—Known only from type-locality.

7. **Dixa (Dixa) zeylanica** Senior-White, 1924.

Spolia Zeylanica xii, p. 381. TYPE-LOC.: Suduganga, Matale, Ceylon (*Senior-White*). TYPES: ♂ & ♀ in Brit. Mus.

ADULT ♀.—Differs from most, if not all, other Indian species of the genus in length of proboscis, which is as long as remainder of head; clypeus nearly twice as long as its breadth at the base; palpi inserted well beyond base of proboscis*. *Head*: pale yellowish above. Tori pale yellow, contrasting with the black flagellum; first flagellar segment rather short and slightly thickened. *Thorax*: largely yellowish; mesonotum with three dark stripes, median lighter in front; pleuræ with irregular dark markings. No sternopleural hairs.

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* The Sumatran *D. binotata* Edw. has a similar proboscis and is in some respects not unlike *D. zeylanica.*

Legs: pale brownish, tips of femora rather conspicuously black, femora with a paler pre-apical ring, bases of tibiæ and first tarsal segments narrowly paler. *Wings* with a rather large and conspicuous dark cloud around cross-veins, and another across middle of vein 5; a brownish border to vein 5.2; no dark spot in upper basal cell. Subcosta ending well before base of radial sector.

♂.—Resembles ♀. Hind tarsus at base beneath with one hair longer than the rest, but not conspicuously so. *Hypopygium*: a pair of short, bare, pointed, and curved hooks arising from tergite (or from paraproct ?); coxite short, with small pubescent apical lobe; style longer than coxite, slightly widened and truncate at tip, with a small, sharp tooth near tip on inner side.

DISTRIBUTION.—Known from type-locality in CEYLON, and from Gua, Singbhum dist., ORISSA, 1,500′, 5. xi. 1929, ♂ reared from larva in forest-stream (*Senior-White*).

8. **Dixa** (**Dixa**) **bistriata** Brunetti, 1911.

Rec. Ind. Mus. iv, p. 268. TYPE-LOC.: Darjiling (*Brunetti*). TYPE: ♂ in Ind. Mus.

ADULT ♂.—*Head*: dark above. First flagellar segment about 5 times as long as broad, but slightly thickened in middle. *Thorax* with yellowish ground-colour, mesonotum with the usual three dark stripes. *Legs*: pale, tips of femora narrowly black. *Wings*: nearly clear, with a small dark brown spot over cross-veins, extending well up into marginal cell, but not reaching vein 1; a brown cloud below middle of vein 5. *Hypopygium*: not examined in detail; style appears rather long, curved, and simple.

DISTRIBUTION.—Known only from type-locality.

9. **Dixa** (**Dixa**) **bifasciata** Brunetti, 1911.

Rec. Ind. Mus. iv, p. 269. TYPE-LOC.: Phagu, 9,000′, Simla dist. (*Annandale*). TYPE: ♀ in Ind. Mus.

ADULT ♀.—Resembles *D. bistriata*, but first flagellar segment shorter; spot over cross-veins smaller and not reaching far into marginal cell; a more conspicuous dark cloud below basal ½ of vein 5.

DISTRIBUTION.—Known only from type-locality.

10. **Dixa** (**Dixa**) **christophersi**, sp. n.

ADULT ♀.—*Head*: entirely blackish, including antennæ and palpi. Clypeus and labium short. First flagellar segment somewhat swollen, but over 4 times as long as its greatest breadth. *Thorax* : almost uniformly blackish, with greyish dusting on mesonotum, the appearance varying with incidence of light ; seen from in front three broad stripes appear almost without dust, the middle stripe divided by a grey line. Hairs all short and black. Scutellum, postnotum, and pleuræ all dark. A few sternopleural hairs present. *Legs* : rather dark brownish, femora lighter towards base ; mid- and hind coxæ pale. *Wings* almost clear, but with a large grey area over cross-veins, not extending up to vein 1 or down as far as vein 5.2. Subcosta ending opposite base of sector. Fork-cells short, upper considerably shorter than its stem. Vein 4 completely bare as far as the cross-vein. *Abdomen* : black. Ovipositor with cerci rather long and narrow ; last sternite with a quantity of pale yellow hair on posterior margin.

♂.—Resembles ♀ in colouring. First flagellar segment of antenna rather shorter. First segment of hind tarsus simple, without long hairs at base beneath. *Hypopygium* (fig. 103, **c**) : small, dark. Coxite small, with small basal lobe but no definite apical lobe. Style short and rather broad, pointed at tip. Tergite simple.

DISTRIBUTION.—KASHMIR : Nara Nag, 7,500′, ix. 1930 (*Christophers*), 5 ♂, 2 ♀, including types, in Brit. Mus. TIBET : Yatung (*Lt.-Col. F. M. Bailey*), 1 ♀ in Brit. Mus.

Dixa (Dixa) platystyla, sp. n.

ADULT ♂.—Very similar to *D. christophersi*, differing as follows :—*Thorax* : less dark, and with less dusting on surface, no line of grey dust visible in front view. *Wings* with grey spot in middle rather smaller, scarcely extending into marginal cell. Fork-cells longer, upper distinctly longer than its stem. Vein 4 with rather numerous short hairs before the cross-vein. *Hypopygium* (fig. 103, **d**) : quite different ; paraproct with a bare finger-like process laterally ; coxite with a short, but distinct, apical lobe ; style more flattened, as seen in side view broadest close to base and rounded at tip (not well shown in figure).

DISTRIBUTION.—KASHMIR : Nara Nag, 7,500′, 20. ix. 1930 (*Christophers*), type and one other ♂ in Brit. Mus.

Subgenus **PARADIXA** Tonnoir, 1924.

Rec. Canterbury Mus. ii, p. 223. Genotype, *Dixa neozelandica* Tonn. (New Zealand).

ADULT.—Antennæ rather longer and more slender than in subgenus *Dixa*, first segment of flagellum cylindrical, not in the least thickened in middle, usually much more than 5 times as long as broad. Hypopygium of ♂ with lobe at apex of coxite long, style also usually long and often forked.

LARVA.—Antenna usually with a group of hairs on inner side towards tip. No dorsal rosettes on abdomen. Apex of large lateral plates of spiracular apparatus with a pointed spur. Caudal projection extending well beyond apex of lateral plates of spiracular apparatus.

The larvæ of most, or all, species of this subgenus live in stagnant water.

Dixa (Paradixa) kashmirensis, sp. n.

ADULT ♀.—*Head*: entirely dark above. Clypeus quite short, dark at base, yellowish at tip. Antennæ all dark, first flagellar segment quite 8 times as long as broad. *Thorax* with yellowish ground-colour, slightly dusted with grey. Mesonotum with three broad dark brown stripes, median stripe not distinctly divided ; area between stripes and on shoulders in front of lateral stripes somewhat darkened ; hairs dark. Scutellum uniformly light brownish. Pleuræ largely dark brown, including *ppn* ; an ill-defined pale stripe across middle, lower part of sternopleura also pale. No sternopleural hairs. *Legs* : light brownish, coxæ all yellowish, tips of femora and tibiæ very narrowly and indistinctly darkened. *Wings* : almost clear, but with a small brown spot over c.-v. 3–4 and basal deflection of 3 (this latter being longer than in most Indian species of the genus). Subcosta ending above base of sector, which is slightly longer than in *D. montana* and related species ; upper fork about as long as its stem, which is somewhat less curved than usual. Vein 4 with some fine hairs. *Abdomen* : blackish ; cerci short and inconspicuous, quite unlike those of most of the Indian species of the subgenus *Dixa*.

DISTRIBUTION.—KASHMIR : Aran, 8,000′, 12. ix. 1930 (*Christophers*), type ♀ in Brit. Mus.

Subfamily *CHAOBORINÆ*.

This subfamily comprises the "phantom-gnats," so-called from the remarkable transparency of the larvæ. Six genera are known, of which only two have hitherto been found within the limits of the Indian region : *Chaoborus* (three species) and *Corethrella* (one species).

The main characters of the subfamily are as follows :—

ADULT.—Mouth-parts short, not adapted for biting ; palpi (in both sexes) 4-segmented, curved inwards in repose (not directed rigidly forwards as in Culicinæ). Antennal flagellum with 13 segments (as in Culicinæ). *Wings* with venation similar to that of Culicinæ, and with a fringe of flattened scales as in that subfamily, sometimes also with definite scales on the veins. *Legs* very hairy, but devoid of scales (differing in this respect from Culicinæ, in which the legs are always covered with scales). *Hypopygium* of ♂ with large coxite and long, simple, terminal style; no definite chitinisation of proctiger; usually no definite phallosome, but a pair of chitinised processes at base of coxites are regarded as parameres.

LARVA.—Very varied in form in the different genera, but in all cases with stout, movable antennæ which are provided with 3–5 strong movable spines at the tip, the antennæ being used to catch living prey. Mouth-brushes absent, or represented by a group of 10 bristles. Fore gut not communicating with mid-gut and often eversible.

Genus **CORETHRELLA** Coquillett, 1902.

Journ. N.Y. Ent. Soc. x, p. 191. Genotype, *C. brakeleyi* Coq.
Rameia Annandale, 1911, Spolia Zeylanica, vii, p. 187.

ADULT.—Very small flies (wing-length 2–3 mm.), superficially resembling some Ceratopogonidæ (such as *Forcipomyia*), but with mosquito-like wing-venation; distinguished from other genera of the subfamily by the relative shortness of vein 1, which ends far before the wing-tip and not far from the tip of the subcosta. Clypeus short and nearly bare. Eyes large, approximated above. Thorax short and rounded. Antenna of ♂ long and densely plumose.

PUPA.—Short and broad; capable of very little movement, and rather resembling the pupa of some Ceratopogonidæ. Paddles represented by a pair of pointed, immovable processes.

LARVA (fig. 104, **a**).—Head large and broad, with a remarkable row of spines on each side, extending rather obliquely from above downwards. Antennæ placed close together in front of head, folding outwards, with three apical spines. Clypeus with four hairs on front margin. Thorax and abdomen provided with long lateral hairs. Segment IX with a short flattened "siphon," which presumably has no respiratory function, as tracheæ are not visible within it.

HABITS.—Little is known as to the feeding habits of the adults or larvæ, but the latter are no doubt predaceous. The habitats of the larvæ are varied; the single Indian species hitherto known lives in swamps, but other species are known to inhabit water in tree-holes, leaf-bases, and pitcher-plants, and it is probable that some of these occur in the Indian region.

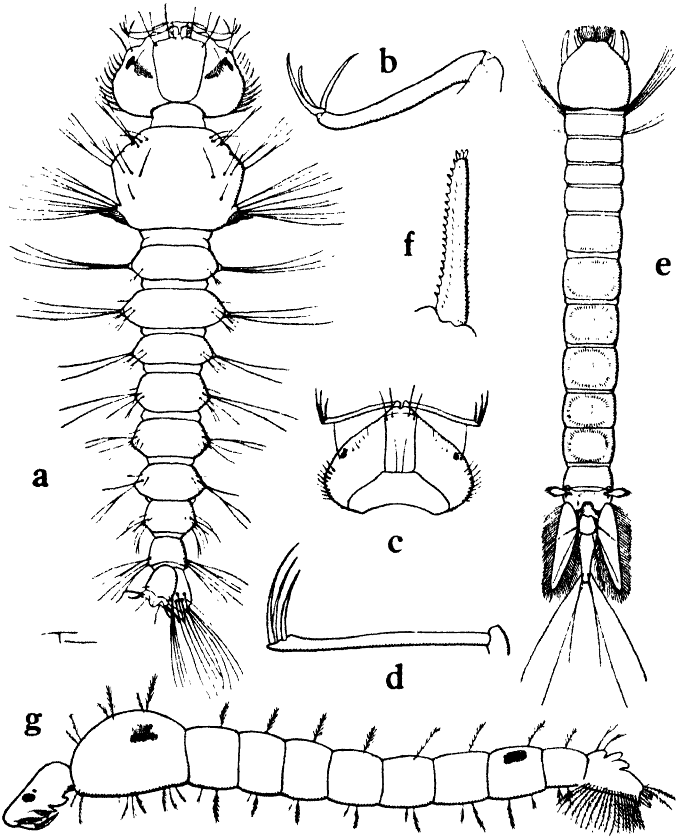
DISTRIBUTION.—*Corethrella* appears to have its headquarters in South America, where a fairly large number of species is known to occur, but the range extends throughout the tropics. Judging from the small number of specimens which exist in collections, the species are never very common.

1. **Corethrella inepta** Annandale, 1911.

Spolia Zeylanica, vii, p. 189 (*Ramcia*). Type-loc.: Diyatalawa, 4,300′, Ceylon (*Major MacDougall*). Type: ♂ in Brit. Mus.

Adult.—Yellowish species, with a single dark band extending across middle of wing, most distinct on costa. Femora entirely pale; tibiæ dark apically; front tarsi somewhat darkened; middle and hind tarsi entirely pale.

Fig. 104.



Larvæ of Chaoborinæ and Dixinæ: **a**, *Corethrella calathicola* Edw. (a Malayan species breeding in pitcher-plants); **b**, antenna of same; **c**, *Corethella inepta* Ann., head; **d**, antenna of same (after Annandale); **e**, *Dixa montana* Brun.; **f**, antenna of same (after Baini Prashad); **g**, *Chaoborus asiaticus* Giles (after Baini Prashad).

Larva.—Distinguished from some other larvæ of the genus by shape of head (fig. 104, **c**), which is pointed in front. Antennæ more slender than in some.

Distribution.—Known only from type-locality.

Genus **CHAOBORUS** Lichtenstein, 1800.

Wiedemann's Arch. Zool. i, p. 174. Genotype, *C. antisepticus* Licht. (?=*crystallinus* De G.).

Corethra, Meigen, 1803, Illiger's Mag. ii, p. 260. Genotype, *C. lateralis* Meig. (as *culiciformis* De G.).

Sayomyia Coquillett, 1903, Can. Ent. xxxv, p. 190. Genotype, *C. punctipennis* Say.

ADULT.—Wing-venation almost as in Culicinæ, with vein 1 ending near wing-tip and well beyond fork of vein 2. Clypeus rather long and densely hairy. Eyes widely separated above. Thorax longer than broad. Antennæ of ♂ plumose, but rather short. First segment of hind tarsi shorter than second.

PUPA.—Abdomen long and narrow. Paddles large, broad, movable, often folded in a fan-like manner. Respiratory horn bladder-like, with minute terminal opening.

LARVA (fig. 104, g).—Head much compressed, narrowed in front, without spines on sides, but with 8–10 flattened bristles in middle line beneath, between base of antennæ and labrum. Antennæ folding downwards, with five movable spines at tip. Few conspicuous long hairs on body. No siphon, and no trace of spiracles or spiracular apparatus. A pair of air-bladders in thorax and another in segment VII of abdomen.

HABITS.—The adults are sometimes found in great numbers over and around lakes and large ponds; so far as known they do not feed. The larvæ occupy a horizontal position in the water, remaining at a considerable depth, and feeding upon small Crustacea and other aquatic animals, sometimes on mosquito larvæ. The larva of an undetermined Indian species has been noted by Annandale as living in the interstices of a freshwater sponge.

DISTRIBUTION.—More or less cosmopolitan.

The three Indian species belong to the subgenus *Sayomyia*, which is distinguished from typical *Chaoborus* by the absence of pulvilli and some small details of venation. They are all small species (wing 2·5–3 mm.), with almost uniformly pale legs. Many other species of the subgenus possess numerous narrow dark rings on the tibiæ, and one or more of these should occur in India. Species of the holarctic subgenus *Chaoborus* are probably to be found in Kashmir.

2. **Chaoborus (Sayomyia) asiaticus** Giles, 1901.

Entom. xxxiv, p. 196 (*Corethra*). TYPE-LOC.: Shahjahanpur, N.W.P., India, 3. x. 1900 (*Giles*). TYPE: ♀ in Brit. Mus.

ADULT*.—Clypeus and tori dark. Mesonotum with three dark stripes on integument, but whole surface covered with dense greyish dust. Scutellum with black median line.

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* Edwards 1930 *c*, p. 534.

Wing-veins and the hair clothing them uniformly pale. *Hypopygium* of ♂ with parameres short, enlarged at tip.

LARVA (fig. 104, g) *.—Apparently differs from those of the European species in the smaller size of the air-bladders in the thorax and abdomen.

DISTRIBUTION.—Widely spread in the Indian region. PUNJAB: Karnal (*Barraud*). BENGAL: Calcutta (*Annandale*); Madhupur (*Paiva*). BIHAR: Pusa (*Sharma*). SOUTH INDIA: Coimbatore (*Fletcher*). CEYLON: Colombo (*Paiva*).

Not certainly known from elsewhere. The Indian species was at one time regarded as the same as the Philippine *C. manilensis*, but is probably distinct.

3. **Chaoborus (Sayomyia) annandalei** Edwards, 1930.

Ann. & Mag. Nat. Hist. (10) vi, p. 535. TYPE-LOC.: Mudon, Amherst dist., Tenasserim (*Annandale*). TYPE: ♂ in Brit. Mus.

ADULT.—Clypeus and tori pale. *Thorax* with scarcely any grey dusting. Scutellum with dark median line faintly indicated. *Wing*-veins all pale, as in *C. asiaticus*. Parameres curved and scarcely swollen apically.

LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

4. **Chaoborus (Sayomyia) indicus** Giles, 1905.

Journ. Trop. Med. vii, p. 59 (*Corethra*). TYPE-LOC.; Seondara, N.W.P., India (*Giles*). TYPE; ♀ in Brit. Mus.

ADULT ♀.—Clypeus black. *Thorax*: as seen from in front largely greyish, with indications of three dark lines; as seen from side dark brownish, with lateral margin narrowly yellowish; scutellum with a black median line. *Wings*: pale, except for veins 3, 5, and 5.2, which are dark brown and clothed with blackish hair.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known from type-locality and from SUMATRA.

III. FURTHER DESCRIPTIONS OF INDIAN CULICINI.

The following notes and descriptions are based chiefly on some material submitted to me by Capt. Barraud after his volume went to press. Among this material are several strikingly distinct species which the Author was unable to place; as, however, it was clearly desirable that they should be described in this volume, he asked me to report upon them.

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* Baini Prashad 1918, p. 154 (*manilensis*).

Genus **AËDES** Meig.

Subgenus **OCHLEROTATUS** L. A.

64. **Aëdes (Ochlerotatus) pullatus** (Coquillett).

A single ♀ collected by Mr. T. B. Fletcher at the same time and place as the ♂ described on p. 152 agrees with the ♂ in having broad scales on *apn* and *ppn*: it also agrees fairly well with the ♀ of *pullatus* as described by Peus (1933). According to Peus, the distribution of scales on the pleuræ affords valuable means of distinguishing some of the closely allied species of the subgenus *Ochlerotatus* in which the tarsi are dark; in *A. pullatus* the meron (hypopleura) is devoid of scales, there is a conspicuous patch of scales immediately below the prothoracic spiracle, and the scales on the mesepimeron extend to, or almost to, the lower margin of this sclerite. These features, together with the absence of scattered pale scales on the costa and on the anterior surfaces of the fore and mid-femora, will separate *A. pullatus* from all other species of the *communis* group in the European fauna.

The specimens referred to on p. 148 as collected by Col. L. G. Browse appear, on re-examination, to be probably *A. pullatus* rather than *A. cataphylla*, as the costa and femora are dark. The scales on *ppn* are not so broad as in the Gulmarg specimens, but the pleural scaling is the same. Several lower mesepimeral bristles are present.

DISTRIBUTION.—KASHMIR: Gulmarg, 5,000′ (*T. B. Fletcher*). Deosai Plain; Shingo River, Chota Deosai, 13,500′; and Tsurri, Indus Valley, Baltistan, 7,700′, vii. 1923 (*L. G. Browse*).

Subgenus **FINLAYA** Theo.

84. **Aëdes (Finlaya) greeni** (Theo).

This must be regarded as a variety of *A.* (*F.*) *aureostriatus* Doleschall, originally recorded from Amboina*. Dr. S. L. Brug has recently obtained in Ceram adults and larvæ of a species which is almost certainly the true *A. aureostriatus*; in these specimens the external ornamentation is rather closely similar to *A.* (*F.*) *greeni* var. *kanaranus*, except that the abdominal tergites lack basal pale bands, a feature which is often unreliable as a specific distinction. The hypopygium of a ♂ from Ceram appears identical with that of one from Ceylon; in both the hairs at the tip of the basal lobe of the coxite are not simple (as wrongly shown in fig. 37, **k**, p. 175, of this volume), but are modified into flattened blades. The larval skin of the specimen from Ceram is damaged, but shows no noteworthy differences from the larva of *A. greeni* as described by Barraud.

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* *Culex aureostriatus* Doleschall, 1857, Nat. Tijd. Ned.-Ind. xiv, p. 385.

Subgenus **AËDIMORPHUS** Theo.

128*a*. **Aëdes (Aëdimorphus) punctifemore** (Ludlow), 1921.

Military Surgeon, xlix, December (*Stegomyia*) (♀). TYPE-LOC.: Fort Wm. McKinley, Rizal, P.I. TYPE: ♀ in U.S. Nat. Mus., Washington.

ADULT*.—Very distinct from other members of the subgenus by the black thorax, with spots of white scales arranged somewhat as in *A.* (*Stegomyia*) *vittatus*; tarsi unbanded. Wing about 4 mm.

♀.—*Head*: dorsum covered with flat black scales in middle, a patch of flat white scales towards each side, and many dark upright scales. Palpi dark, with a tuft of pale hairs at tip. Proboscis of moderate length, mainly light brownish, with tip black. Clypeus black, bare. Basal segment of antenna with some flat white scales. *Thorax* with integument black, somewhat shiny; mesonotum clothed for the most part with small, narrow black scales and with small, flat, silvery-white scales arranged chiefly in seven small spots, distributed as follows: a pair of spots close to front margin; another pair about middle of mesonotum, directly behind first pair; a median spot at anterior end of ante-scutellar bare space, and a spot at each side of this space immediately in front of the scutellum. Scutellar scales flat and white. Scales on *apn* white, few in number, those on upper part of *ppn* narrow and black. *Wings*: dark scaled. *Legs*: black, including all tarsi; femora and tibiæ with some scattered silvery-white scales tending to form small spots; front tibia with a silvery-white spot at tip, less distinct white tips to other tibiæ and to femora. *Abdomen*: black, tergites with basal lateral white spots.

♂.—Unknown in India. *Hypopygium*, as described by Dyar, similar in type to that of other members of the subgenus.

LARVA.—Unknown.

DISTRIBUTION.—Two females taken at Gaya, BIHAR, 1928 (*V. T. Korke*). Otherwise known only from Rizal, PHILIPPINE ISLANDS.

Subgenus **CANCRAËDES** Edw.

The species described on p. 444 is referred to this subgenus with considerable hesitation, but, according to the present classification, it cannot well be placed in any other group. In ornamentation it is, perhaps, more like *A.* (*Aëdes*) *yusafi* than any other Indian species, but can hardly be placed in the subgenus *Aëdes* on account of the broad scutellar scales.

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* Dyar and Shannon 1925, p. 75 (*A.* (*Finlaya*)); Dyar 1925, p. 217.

170*a*. Aëdes (Cancraëdes ?) kanarensis, sp. n.

Type-loc. : Yellapur, N. Kanara, 6. x. 1921 (*P. J. Barraud*).
Type : 5 ♀♀ co-types in Brit. Mus.

Adult.—A medium-sized blackish species, well characterized by the white longitudinal stripe on pleuræ, single white ring on hind tarsi, and tufted abdominal sternites, as in some species of the subgenus *Finlaya*. Wing about 3·5 mm.

♀.—*Head* : scales on dorsal surface all broad, flat, and close-lying, almost all black, but a few white ones around eye-margins, and a small white patch low down on each side ; a very few upright scales on nape. Proboscis about length of fore femur, slender, dark. Palpi about $\frac{1}{5}$ length of proboscis, dark. Clypeus blackish, bare. Tori dark brownish, bare. Eyes only very narrowly separated. *Thorax* : integument entirely blackish ; mesonotum clothed for the most part with narrow, straight, blackish-brown scales, but with a rather broad border of narrow white scales extending round front margin and back to wing-base on each side. No dorso-central bristles, and, so far as can be seen, no prescutellars. Scutellum densely covered with broad, flat, blackish scales. Pleuræ largely bare of scales, but with a conspicuous white stripe extending from *apn* to above base of hind coxa ; *apn* covered with flat white scales, *ppn* largely bare, with a few narrow blackish scales above and broader ones below. About 4–6 posterior pronotal and a similar number of postspiracular bristles, latter pale in colour. The small lateral sclerite of the mesonotum (in front of wing-base) clothed with flat white scales, forming part of the white border. *Wings* : dark scaled, scales dense, those in plume series rather broadly ligulate. Venation normal, fork-cells about as long as their stems, bases about level. *Legs* : mainly blackish ; coxæ yellow, clothed in front with white scales ; undersides of femora yellowish, hind femora almost entirely yellowish on the basal $\frac{5}{6}$; pale knee-spots present but quite inconspicuous. First segment of mid- and hind tarsi with a white ring at base, all tarsi otherwise entirely dark. Claws simple. Hind tibia as long as front pair, first hind tarsal segment noticeably shorter than tibia. *Abdomen* : scaling of dorsal surface entirely black, with slight bluish lustre, tergites with small lateral basal white spots not visible from above. Sternites largely whitish, with black scales on hind borders, those on sternites VI and VII (and to a less extent on V) long and suberect, giving a tufted appearance. Segment VIII in all specimens entirely concealed within VII.

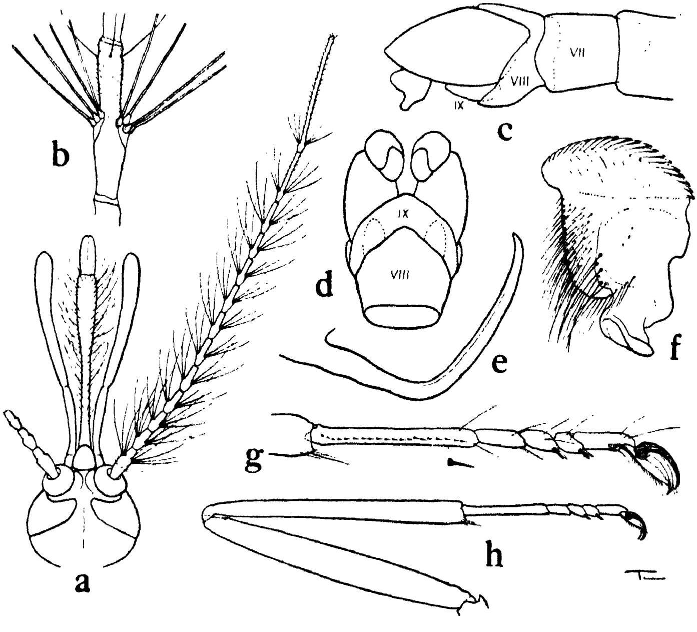
♂ and Larva.—Unknown.

Distribution.—Malabar coast only ; type-locality, as given above, also x. 1915 (*Khazan Chand*).

Subgenus **INDUSIUS,** nov.

This new subgenus is proposed for the species of which the male sex is described on p. 269. Having now examined the two specimens referred to, I believe there can be little doubt that they are males of *A. pulverulentus* Edw.: they agree in chætotaxy with the genus *Aëdes* (presence of squamal fringe, absence of spiracular and presence of postspiracular bristles, etc.); they are somewhat smaller than the female *A. pulverulentus* (as might be expected); although very largely denuded of scales, one specimen shows similar scaling of the head to the female *A. pulverulentus* (large area of flat whitish scales in middle, flat dark scales at sides); and, finally, they were taken in the same area as the female *A. pulverulentus.*

Fig. 105.



Structural details of *Aëdes* (*Indusius*) *pulverulentus* Edw., ♂: **a,** head from above; **b,** one segment of antennal flagellum; **c, d,** end of abdomen from side and from beneath (diagrammatic); **e,** process arising from proctiger or base of coxite; **f,** style from side; **g,** front tarsus; **h,** whole front leg.

The new subgenus is sufficiently distinguished by the remarkable form of the male palpi, front tarsi, and hypopygium, which in many respects resemble those of the New Zealand genus *Opifex*; unfortunately no definite features can be adduced by which the female may be distinguished from other subgenera of *Aëdes.*

The following details can be made out in the two damaged males available :—

Head : eyes rather widely separated above, and distinctly separated below. Orbital bristles normal, few in number ; no fine hairs mixed with the scales on dorsal surface of head (this feature distinguishing *Indusius* from *Opifex*). *Proboscis* rather short, distinctly swollen on distal ½, but narrowed again at tip ; provided with long hairs ventro-laterally for almost its whole length. *Palpi* about as long as proboscis, clothed with dark scales, but with few or no hairs, swollen apically, with an incomplete joint before middle, distal portion entire. *Antennæ* unusually long in proportion to proboscis, with the plumes reduced, only about 8 hairs in each whorl.

Legs : femora rather thick, especially front pair ; front tibia also somewhat thickened. Tarsi all unusually short, front and middle pairs shorter than their tibiæ ; first hind tarsal segment scarcely more than ½ as long as tibia (in ♀ it is longer). Front tarsus with a double row of microscopic spinules along under surface of segment 1 ; segments 3 and 4 remarkably short, with spines at tip beneath ; claws large, equal, and simple. Middle tarsus longer, unmodified, claws slightly unequal, the larger with a strong tooth near base ; empodium large and feathery, as on front legs.

Hypopygium : large ; coxites large, somewhat conical, without lobes or appendages other than the style, which is subterminal in position, broad but irregular in shape, without appendage ; a pair of long bent rods apparently arise from proctiger (or possibly from base of coxite) ; structure of phallosome not ascertainable in the dissected specimen (tip of abdomen in other specimen missing).

Genus **PARAËDES,** gen. n.

This new genus is proposed for two Indian species which, though very different in ornamentation, and probably not at all closely related, agree in possessing the following characters :—

Margin of squama quite bare. Membrane of wing with distinct microtrichia. Pulvilli absent. Anterior pronotal lobes small and well separated. Several posterior pronotal and a few postspiracular bristles present, but no spiracular and no lower mesepimeral. Wing-venation normal ; vein 6 extending to well beyond the base of the fork of vein 5. Wing-scales normal, not emarginate at tips.

This combination of characters makes it impossible to include these species in any genus of Culicini at present known.

The presence of postspiracular bristles suggests some affinity with the *Aëdes* group, but the bare squama, now regarded as a feature of generic importance, prevents their inclusion in *Aëdes*. The normal wing-venation, with moderately long upper fork-cell, separates the species from *Uranotænia* or *Zeugnomyia*; the normal wing-scales from *Hodgesia*; the absence of spiracular bristles from *Topomyia* or *Harpagomyia*; and the presence of postspiracular bristles from any of these genera. The structure of the hypopygium of the genotype (described below) is very peculiar, and quite unlike that of any other known species.

Early stages unknown.

Genotype, *P. barraudi*, sp. n.

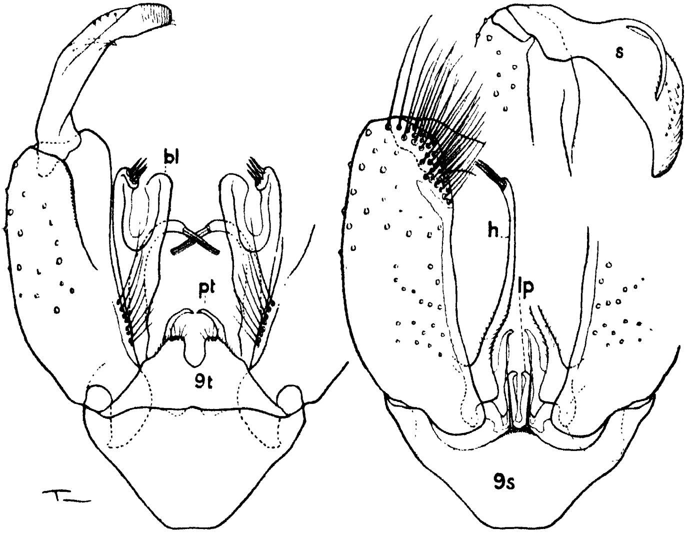
170 *b*. **Paraëdes barraudi,** sp. n.

Type-loc. : Virajpet, Coorg. S. India, vi. 1927 (*J. D. Baily*).
Type : 2 ♂♂ co-types in Brit. Mus.

Adult.—A small dark-coloured species without special ornamentation of body or legs, and with short palpi in ♂. Wing about 2·5 mm.

♂.—*Head* : scales on dorsal surface nearly all flat and black, a few narrow whitish scales on nape and a row of similar scales round eye-margins; a small patch of flat white scales low down at sides. Orbital bristles fairly numerous, dark. Proboscis about length of fore femur, slender and dark. Palpi very short, about $\frac{1}{10}$ length of proboscis and projecting beyond clypeus by scarcely the length of the latter. Clypeus and tori dark, bare. Antennæ slightly shorter than proboscis, plumes moderately developed, evenly spread round shaft. *Thorax* : blackish, clothed dorsally for the most part with narrow dark brown scales, but with a few white scales on front margin of mesonotum, pairs of small indefinite spots of white scales on disc, and a few such scales on each side of the ante-scutellar bare space; scutellar scales narrow and white. Some flat white scales on *apn* and a few on lower part of *ppn*; some narrow white scales on upper part of *ppn*. Numerous long and rather stout dark bristles on mesonotum. Pleuræ in both specimens damaged by pins, but chætotaxy, as noted in generic diagnosis, can be made out. *Wings* : dark scaled; fork-cells somewhat shorter than their stems, base of *af* slightly nearer base of wing than that of *pf*. *Legs* : dark scaled, undersides of femora pale, inconspicuous white knee-spots present. Claws all small and equal, those of fore and mid-tarsi each with a small basal tooth. First hind tarsal segment slightly shorter than tibia. *Abdomen* : dark above, tergites with small lateral white areas extending from base nearly to hind margin of segments. *Hypopygium* (fig. 106) : 9*t* better developed than usual, with a pair of rounded and almost bare lobes placed close together. Coxite nearly cylindrical, more than twice as long as broad, with a tuft of hairs at the somewhat truncate tip, no apical or subapical lobe; *bl* large, arising from base and reaching to tip of coxite, forked at mid-length, inner branch with bluntly rounded tip, outer more pointed, and bearing short bristles at tip, *bl* otherwise bare. A pair of well-developed harpagones present, in the form of long curved rods, as long as coxite, with a pair of spines at tip. Paraprocts represented by a pair of short, bare curved hooks.

Fig. 106.



Hypopygium of ♂ in tergal (left) and sternal view (right) of *Paraëdes barraudi*, gen. et sp. n. Lettering as on p. 4.

Phallosome small, divided into lateral plates. Style broad, without appendage, but with a slender finger-like process on external margin well before middle.

♀ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

170*c*. **Paraëdes (?) argyrurus,** sp. n.

TYPE-LOC.: Nongpoh, Assam, 14. vi. 1921 and iii. 1927 (*Christophers*). TYPE: 2 co-type ♀♀ in Brit. Mus.

ADULT.—Rather small species, with reddish thorax, conspicuous silvery markings on pleuræ and sides of abdomen, and four white rings on hind tarsi. Wing about 2·5–3 mm.

♀.—*Head*: scales on dorsal surface all broad and flat, mostly black, but with a broad oblique stripe of white on each side and a small white area in front between the eyes, which are not very widely separated; scales on under surface of head yellowish; a few dark upright scales on nape. Upper pair of orbital bristles strong, others weaker but fairly numerous. Proboscis about length of fore femur, slender, recurved, dark. Palpi about ⅛ length of proboscis, entirely dark. Clypeus of normal shape, dark, bare. Tori yellowish, bare. *Thorax*: integument uniformly reddish-ochreous; mesonotum clothed rather densely with small narrow brown scales, no lighter scales, even above wing-roots or on front margin; two pairs of dorso-central bristles on disc, in addition to several in front of scutellum. Scutellum largely bare, but with a small patch of flat dark brown scales on each lobe. Pleuræ with four patches of flat silvery-white scales: one (the largest) forming a longitudinal stripe immediately below mesonotal border, one on upper part of mesepimeron, one in middle of sternopleura, and one on lower part of sternopleura immediately above base of mid-coxa; *apn* clothed with flat silvery-white scales; *ppn* devoid of scales, as is also the postspiracular area. About 4–5 posterior pronotal and 3–4 postspiracular bristles; few sternopleural. *Wings*: dark scaled, scales moderately dense, those in plume series narrow. Venation normal, fork-cells about as long as their stems, bases level. Knob of halteres with black scales at base, silvery at tip. *Legs*: dark scaled, undersides of femora yellow; hind femora largely yellow, but dark above to base; all femora (but not tibiæ) with small white knee-spots; all tarsi with narrow white rings at bases of each of the first three segments, hind tarsi also with a broad white ring on fourth segment, leaving only the tip narrowly black; fifth segment black. Claws simple. *Abdomen*: dorsal surface mainly dark scaled, with narrow and rather indefinite yellowish bands at bases of tergites II–VII; tergite VIII with a conspicuous patch of silvery scales; tergites I–VII each with a lateral subbasal patch of metallic silvery scales; venter mainly yellow. Cerci small and hidden within segment VIII.

♂ and LARVA.—Unknown.

DISTRIBUTION.—Known only from type-locality.

This species rather suggests some members of the subgenus *Stegomyia*, from all of which, however, it differs in the entire absence of white markings on the mesonotum, as well as in the completely bare squama.

Genus **CULEX** L.

Subgenus **CULEX**, s. str.

Since this volume went to press Capt. Barraud has submitted for study an extensive series of specimens of *Culex* of the *mimeticus* group, chiefly from the Nilgiri Hills and other localities in South India. Further material has also been received from Dr. R. B. Jackson from Hong Kong and from other correspondents in China. The results of the study of this material, in conjunction with that already in the British Museum collection, are given here. It was found that four (instead of three) distinct forms occur in India; another distinct form occurring in Hong Kong is described to complete the account. All these forms are here allotted specific rank, as the distinctions observed appear quite definite, but it is possible that *mimuloides* and the two new forms may be merely varieties of *mimeticus*.

When distinguishing *C. mimulus* from *C. mimeticus* in 1915 I laid most stress on the dark-scaled third vein. This, however, is not constant; the amount of pale scaling on the third vein, also the actual and relative size of the pale costal spots, is subject to a good deal of individual variation in all forms of this group. The best distinctions between the various forms now appear to be those given in the key below.

Key to Species or Varieties of C. mimeticus *group.*

♀♀.

1.	First pale costal spot (at middle of wing) extending only on to subcosta	2.
	First pale costal spot extending over vein 1.	6.
2.	Bases of fork-cells dark (sometimes a small pale spot at base of upper fork only); tergite VII broadly pale apically	*fuscifurcatus*, sp. n., [p. 452.
	Bases of both fork-cells pale; tergite VII narrowly pale apically	3.
3.	Veins 3 and 5.1 pale practically to the tips (Java only)	*diengensis* Brug.
	Veins 3 and 5.1 very distinctly dark-tipped	4.
4.	Fork-cells with their bases nearly level; vein 3 largely pale	5.
	Base of *pf* distinctly proximal to that of *af*; vein 3 with a smaller pale area or none...	*mimuloides* Barr., [p. 451.
5.	Mesonotal scales uniformly reddish-brown .	*jacksoni*, sp. n., p. 452.
	Mesonotum with distinct mottling of light and dark scales	*mimeticus* Noé, p. 451.
6.	First pale costal spot not extending beyond vein 1; vein 5.2 dark to the tip	*mimulus* Edw.
	First pale costal spot extending over vein 4; vein 5.2 broadly pale at tip	*orientalis* Edw.

The distinctions noted in this key will apply in the main to both sexes, but, as usual in mosquitoes, the ornamentation of the ♂ is often less well marked than that of the ♀, and specimens of the former sex are best distinguished on hypopygial characters.

236. Culex (Culex) mimeticus Noé.

ADULT ♀.—Mesonotum mottled with yellowish and brownish scales, the lighter scales tending to form three spots on anterior ½, one near front margin and a pair in middle. *Wings* with bases of forks more or less level, or *af* slightly proximal to *pf*, length of forks rather variable, but *af* usually about 3 times as long as its stem; a spot of pale scales always present at base of each fork. Vein 3 almost always extensively pale in middle, leaving base and tip rather narrowly dark; pale spot at middle of costa variable in width, but never involving vein 1; vein 5.2 usually devoid of pale scales at tip. *Legs* with practically the same ornamentation as in other species of the group; hind femora largely dark on anterior surface except towards base, pale beneath almost to tip. *Abdomen* with basal white bands to tergites which do not spread out laterally as seen from above; tergite VII with a narrow apical pale band.

♂.—Ornamentation similar. *Hypopygium* as described on p. 411.

LARVA as described on p. 411.

DISTRIBUTION.—In India this species appears to occur chiefly in the north. Specimens are in the British Museum from Bakloh, N.W.P. (*Lindesay*); Nara Nag, KASHMIR (*Christophers*); Shillong and Cherrapunji, ASSAM (*Senior-White*); and Pusa, BIHAR (*Sharma*). No specimens have been seen from the hills of South India, but two atypical ♀♀ from CEYLON appear to belong here rather than to *C. mimuloides*.

More or less typical specimens have been examined from MACEDONIA, PALESTINE, TIBET (Yatung), NORTH CHINA (Pekin), SOUTH CHINA (Nanking District; Hangchow; Kiangsi; Chekiang), HONG KONG, and FORMOSA. So far as can be judged from the description, the Algerian *C. pseudomimeticus* Sergent does not differ appreciably from the typical form of this species.

236*a*. Culex (Culex) mimuloides Barr.

ADULT ♀.—*Thorax* as in *C. mimeticus*. *Wings* with fork-cells very long, base of *pf* very noticeably proximal to that of *af*, both forks with distinct spot of pale scales at base. Scales often appearing shorter and less dense, and wings rather narrower than in *C. mimeticus*. Vein 3 usually with a short pale area in middle, sometimes more extended, but occasionally reduced or absent. Vein 5.2 usually with a few white scales at extreme tip. Pale spot in middle of costa as in *C. mimeticus*, never involving vein 1. *Legs* almost as in *C. mimeticus*, but hind femora usually rather extensively dark beneath towards tip, and often with a pale line on anterior surface extending almost to tip between the dark dorsal and ventral areas. *Abdomen* as in *C. mimeticus*.

♂. Ornamentation similar, but wing-markings often less distinct : position of forks as in ♀. *Hypopygium* as described on p. 411.

LARVA not yet isolated.

DISTRIBUTION.—Confined, so far as known, to South India. NILGIRI HILLS : Ootacamund (*Fletcher*, *Puri*) ; Coonoor (*Puri*) ; various unrecorded localities (*Khazan Chand*) ; PALNI HILLS : Kodaikanal (*Patton*).

Culex (Culex) jacksoni, sp. n.

ADULT ♀.—Closely resembles *C. mimeticus* in almost all respects, but mesonotal scales almost uniformly reddish-brown, without trace of pale spots on anterior $\frac{1}{2}$; a few pale scales present around margin and in front of scutellum.

♂.—Thoracic scaling as in ♀. *Hypopygium* : closely resembling that of *C. mimeticus* ; no obvious differences discoverable in the single specimen available.

LARVA.—Quite distinct from the typical form of *C. mimeticus*, and more resembling, though equally distinct from, *C. mimulus*. Antenna as in *mimulus*, with subapical bristles fairly near tip, and some spinelets beyond tuft. Mentum with fairly regular teeth. Comb-teeth as in *mimeticus*, ending in a long and strong spine. Siphon short, scarcely 5×1 ; pecten of about 15 teeth, extending nearly $\frac{1}{2}$ length of tube, teeth rather short and with strong denticles, as in *mimulus* ; only three pairs of ventral tufts, which are little, if any, longer than diameter of tube ; one small lateral tuft near end of tube. One of the two isolated skins (♀) shows 2 short thick spines on distal $\frac{1}{2}$ of siphon-tube on each side ; the other (♂) has no distinct spines, but some thickenings of the chitin. Anal segment with *isc* 2–3-branched ; *lh* quite short and 2-branched.

DISTRIBUTION.—HONG KONG. Described from 1 ♂, 1 ♀, with isolated larval skins, from Shonson Hill, 18. iii. 1932 and 16. ii. 1933 (*Dr. R. B. Jackson*). Types in Brit. Mus.

236 *b*. **Culex (Culex) fuscifurcatus**, sp. n.

ADULT ♀.—Mesonotum somewhat less mottled and more reddish-tinged than in *C. mimeticus*. *Wings* with forks of moderate length, bases about level and usually entirely without pale scales, though a few such scales may be present at base of *af*. Vein 3 extensively pale in middle, dark at base and tip. No white scales at tip of vein 5.2. *Legs* as in *C. mimeticus*. *Abdomen* with basal pale bands tending to spread out along sides of tergites; tergite VII with a broad apical pale band.

♂.—Ornamentation as in ♀; in one specimen the lateral extension of the basal bands of the tergites is even more marked. *Hypopygium* with coxite, style, and phallosome almost as in *mimeticus*, but differing strikingly in the complete absence of the basal arm of the paraproct.

LARVA.—Unknown.

DISTRIBUTION.—Known only from NILGIRI HILLS: Ootacamund, 7,500′, xii. 1913, 3 ♂♂, including type, in Brit. Mus. (*T. B. Fletcher*); 1 ♂, 3 ♀♀, locality unspecified, x. 1915 (*Khazan Chand*).

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All names printed with a small initial letter indicate a species or variety.

All names printed in bold type are valid names of Indian Culicidæ; names of genera or groups have a capital initial letter.

All names printed in italics are synonyms.

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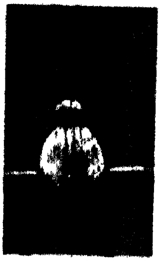
PLATE I.

Aëdes, subgenus *Finlaya*. Head and thorax, showing markings.

Fig. 1. *A.* (*F.*) *albolateralis* Theo. ♂.
2. ,, ,, ♀.
3. ,, ,, ♀. (Variation.)
4. ,, *deccanus* Barr. ♀.
5. ,, *gubernatoris* Giles. ♂.
6. ,, ,, ♀.
7. ,, *cacharanus* Barr. ♂.
8. ,, ,, ♀.
9. ,, *khazani* Edw. ♂.
10. ,, ,, ♀.
11. ,, *assamensis* Theo. ♂.
12. ,, ,, ♀.
13. ,, *unicinctus* Edw. ♂.
14. ,, ,, ♀.
15. ,, *albotæniatus* Leic. ♂.
16. ,, ,, var. *mikiranus* Edw. ♀.

PLATE I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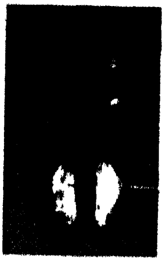
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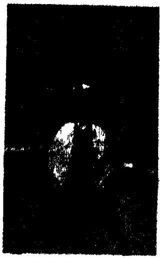
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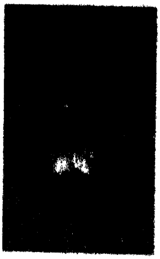
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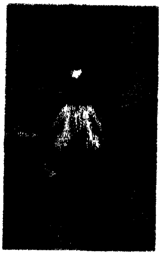
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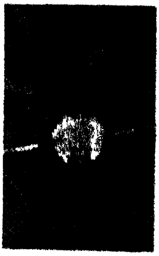
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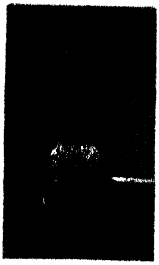
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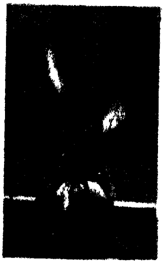
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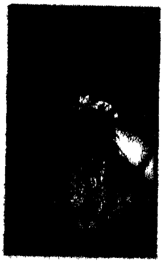
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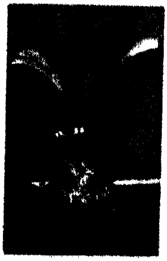
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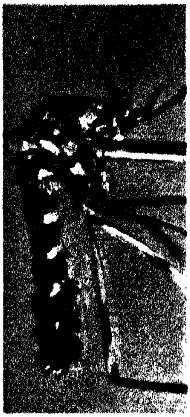
16.

AËDES (FINLAYA)

PLATE II.

Aëdes, subgenus *Finlaya*. Side view, showing scaling of thorax and abdomen and hind femur.

Fig. 1. *A.* (*F.*) *assamensis* Theo. ♀.
2. ,, *khazani* Edw. ♂.
3. ,, *cogilli* Edw. ♀.
4. ,, *inquinatus* Edw. Type ♂.
5. ,, *lophoventralis* Theo. ♀.
6. ,, *albotæniatus* Leic. ♂.
7. ,, *albolateralis* Theo. ♀.



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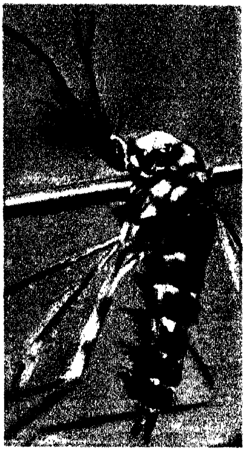

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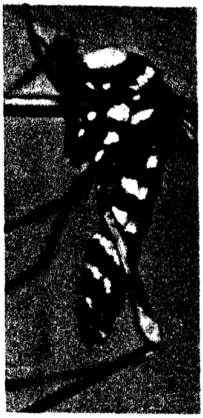

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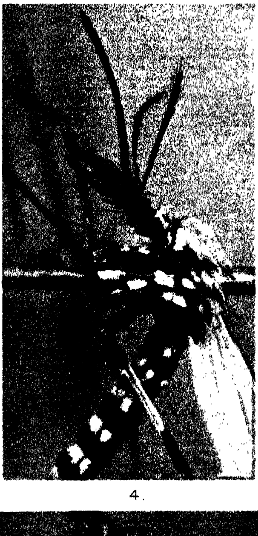

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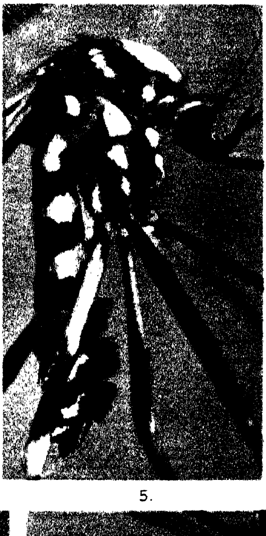

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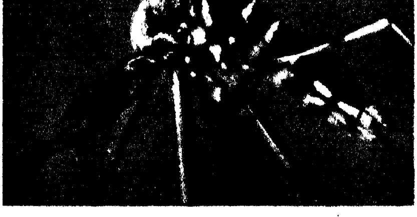

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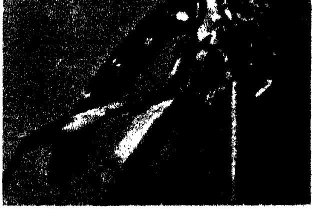


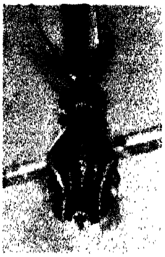
7.

AËDES (FINLAYA)

PLATE III.

Aëdes, subgenus *Finlaya*. Head and thorax, showing markings.

Fig. 1. *A.* (*F.*) *elsiæ* Barr. ♀.
2. ,, *saxicola* Edw. ♀.
3. ,, *simlensis* Edw. ♀.
4. ,, *pulchriventer* Giles. ♀.
5. ,, *greeni* (Theo.) var. *kanaranus* Barr. ♂.
6. ,, *greeni* Theo. (type-form). ♀.
7. ,, *pallirostris* Edw. ♀.
8. ,, *chrysolineatus* Theo. ♀.
9. ,, *oreophilus* Edw. ♀.
10. ,, *pseudotæniatus* Giles. ♀.
11. ,, *suffusus* Edw. ♀.
12. ,, *christophersi* Edw. ♀.
13. ,, *oreophilus* Edw. ♂.
14. ,, *macdougalli* Edw. ♀. (Showing pale underside of proboscis.)
15. ,, *stevensoni* Barr. ♀.
16. ,, *dissimilis* Leic. ♀. (Showing markings of mid-femora.)



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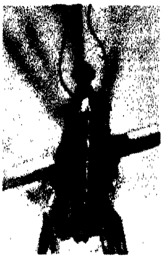

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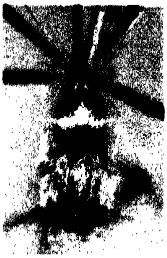

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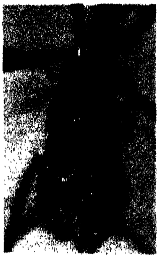

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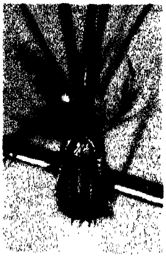

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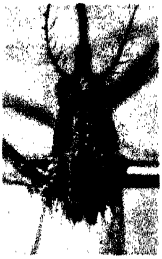

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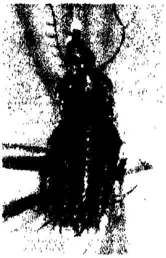

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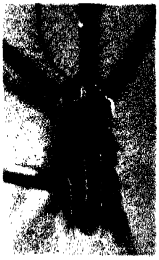

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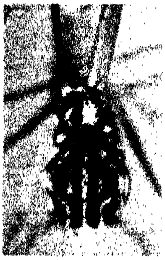

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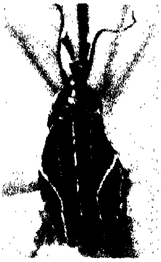

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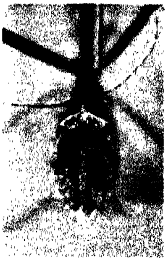

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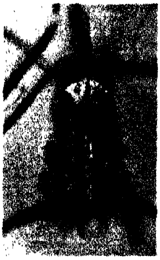

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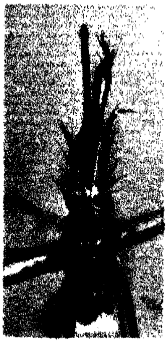

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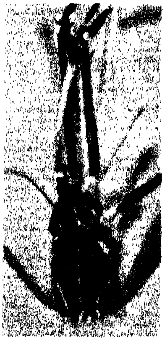

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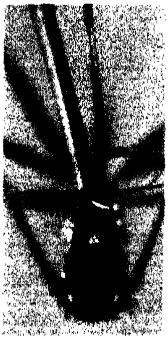

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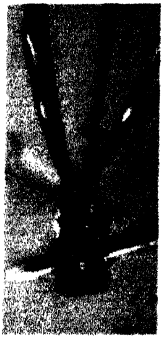


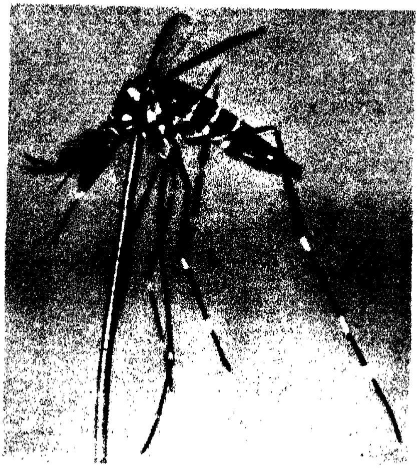
16.

AËDES (FINLAYA)

PLATE IV.

Aëdes, subgenus *Finlaya.* Side view, showing markings.

Fig. 1. *A.* (*F.*) *stevensoni* Barr. ♂.
2. ,, *harveyi* Barr. ♀.
3. ,, *chrysolineatus* Theo. ♀.
4. ,, *unicinctus* Edw. ♀.
5. ,, *albotœniatus* Leic. var. *mikiranus* Edw. ♀.
6. ,, *dissimilis* Leic. ♂.



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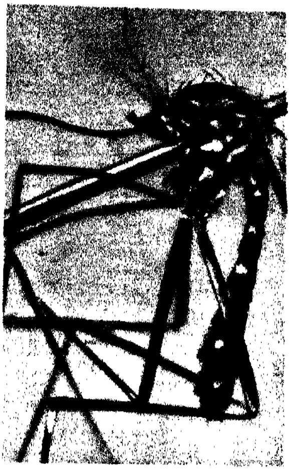

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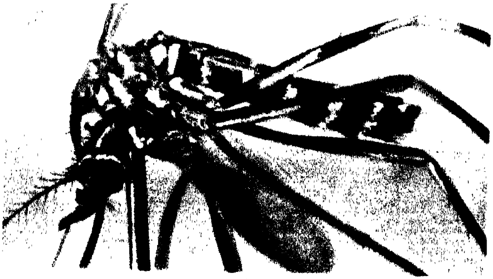

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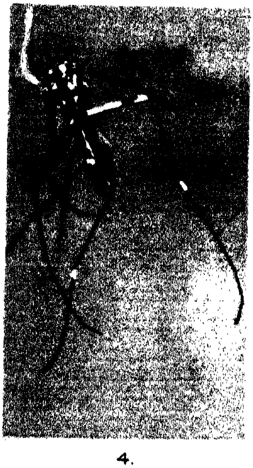

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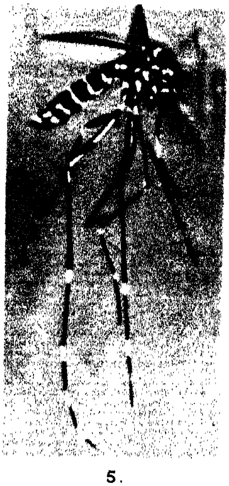

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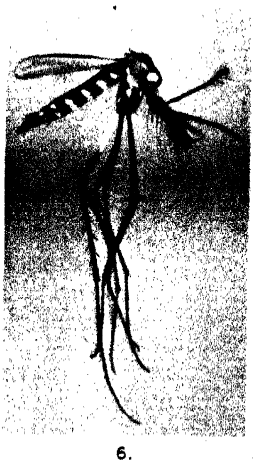


6.

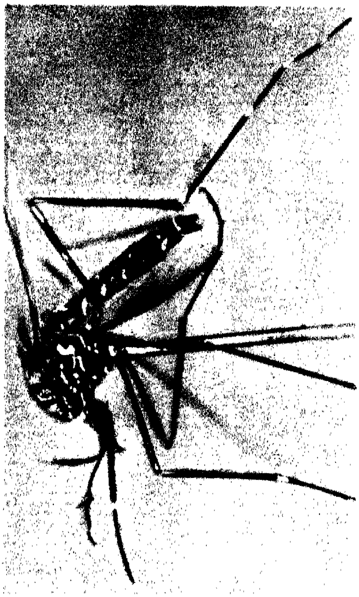
AËDES (FINLAYA)

PLATE V.

Aëdes, subgenus *Finlaya*. Side view, showing markings.

Fig. 1. *A.* (*F.*) *chrysolineatus* Theo. ♂.
2. ,, *shortti* Barr. ♂.
3. ,, *oreophilus* Edw. ♂.
4. ,, *pseudotæniatus* Giles. ♂.

PLATE V



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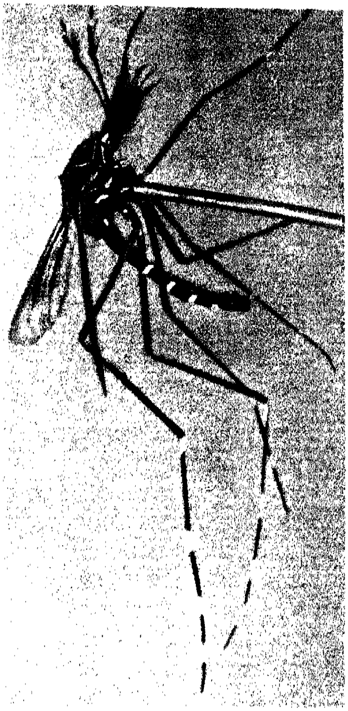

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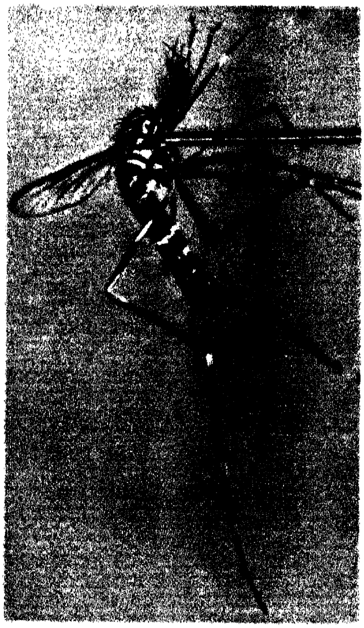

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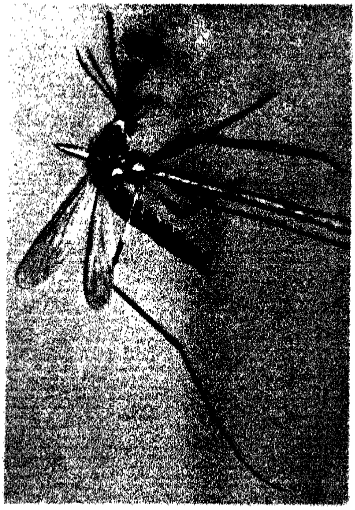


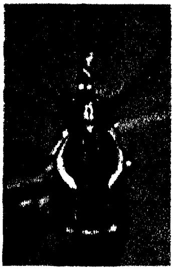
3.

AËDES (FINLAYA)

PLATE VI.

Aëdes, subgenera *Stegomyia* and *Christophersiomyia*.
Head and thorax, showing markings.

Fig. 1. *A.* (*S.*) *ægypti* Linn. (*S. fasciata*). ♀.
2. ,, *albopictus* Skuse. ♀.
3. ,, *unilineatus* Theo. ♀.
4. ,, *vittatus* Big. ♀.
5. ,, *edwardsi* Barr. ♀.
6. ,, *w-albus* Theo. ♀.
7. ,, ,, ♀. (Variation.)
8. ,, ,, ♂.
9. ,, *annandalei* Theo. ♀.
10. ,, *mediopunctatus* Theo. ♀.
11. *A.* (*C.*) *annulirostris* Theo. ♀.
12. ,, *thomsoni* Theo. ♀.
13. *A.* (*S.*) *ægypti* Linn. (*S. fasciata*). ♂.
14. ,, *albopictus* Skuse. ♂.
15. ,, *vittatus* Big. ♂.
16. *A.* (*C.*) *thomsoni* Theo. ♂.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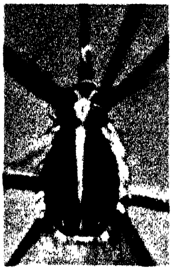
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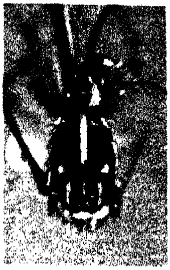
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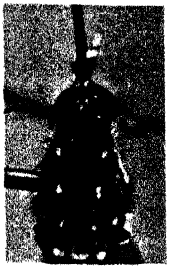
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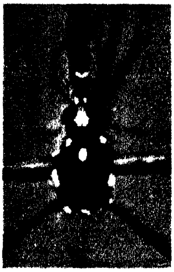
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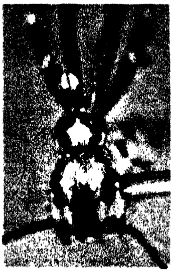
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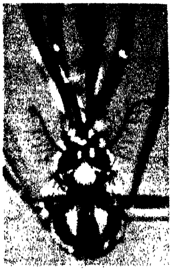
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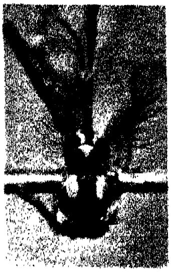
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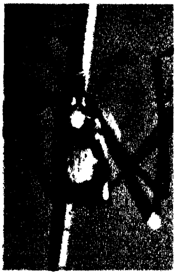
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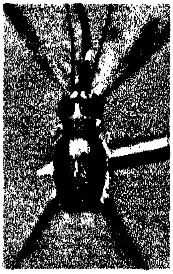
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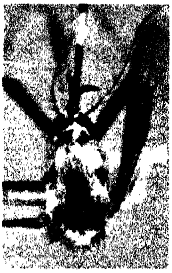
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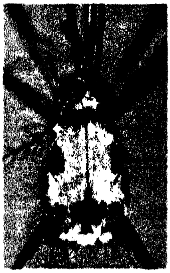
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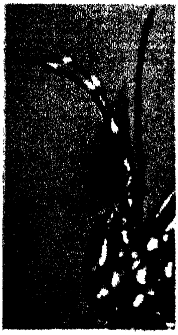
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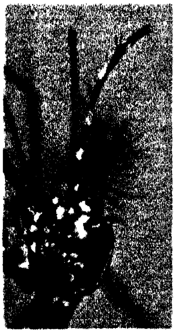
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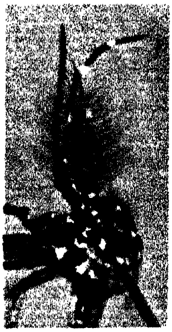
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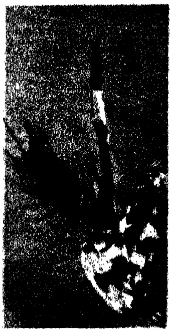
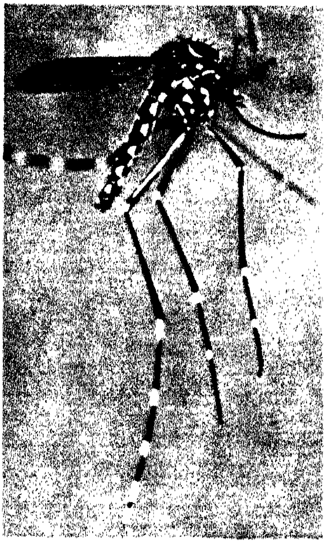

16.

AËDES (STEGOMYIA, CHRISTOPHERSIOMYIA)

PLATE VII.

Aëdes, subgenus *Stegomyia*. Side view, showing markings.

Fig. 1. *A.* (*S.*) *ægypti* Linn. (*S. fasciata*). ♀.
2. ,, *albopictus* Skuse. ♀.
3. ,, *edwardsi* Barr. ♀.
4. ,, *vittatus* Big. ♀.



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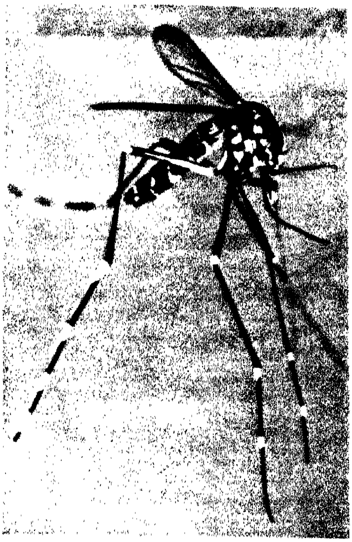

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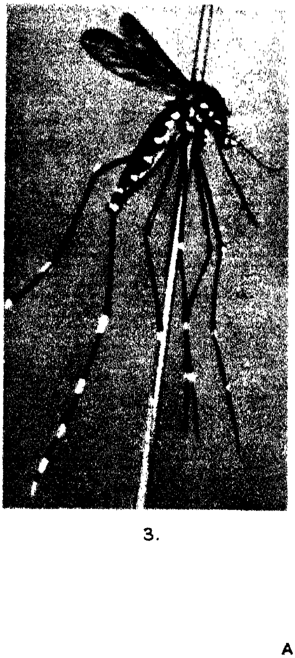

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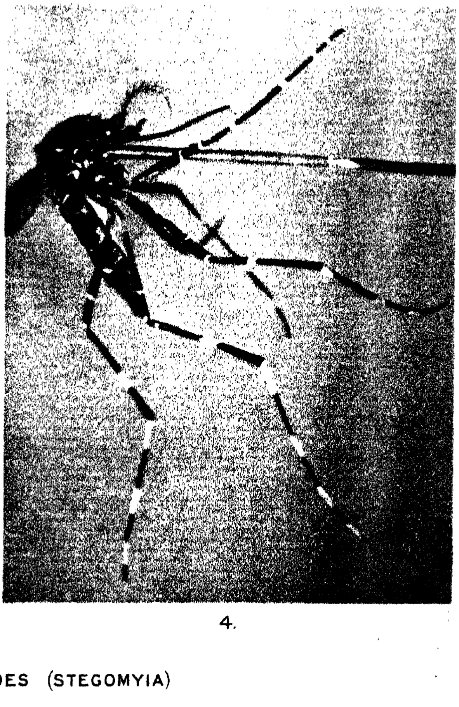


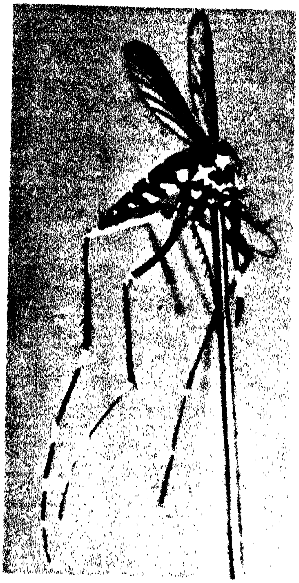
4.

AËDES (STEGOMYIA)

PLATE VIII.

Aëdes, subgenera *Christophersiomyia* and *Stegomyia*.
Side view, showing markings.

Fig. 1. *A.* (*C.*) ***annulirostris*** Theo. ♀.
2. ,, ***thomsoni*** Theo. ♀.
3. *A.* (*S.*) ***w-albus*** Theo. ♀.
4. ,, ***mediopunctatus*** Theo. ♀.
5. ,, ***annandalei*** Theo. ♀.



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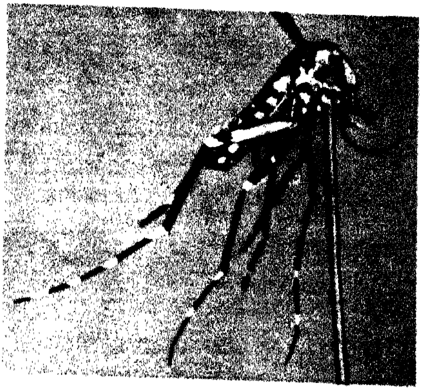

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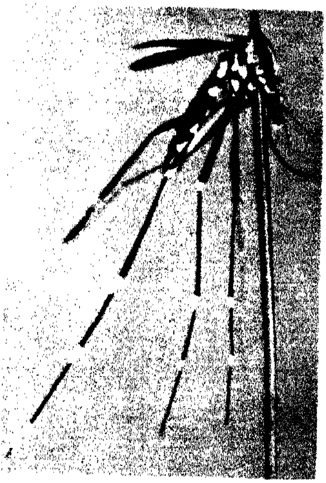

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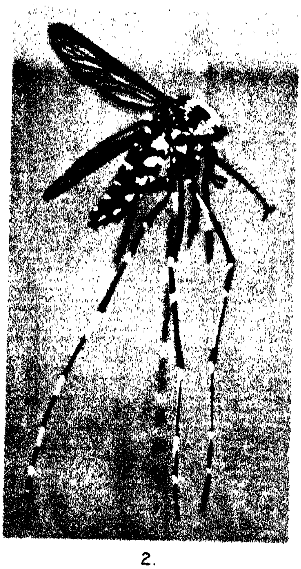

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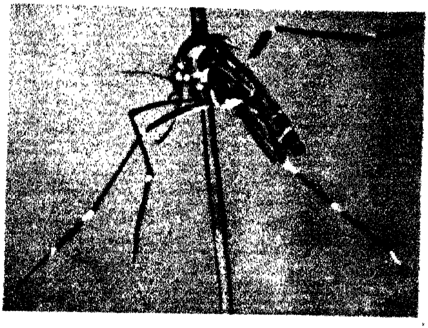

5.

AËDES (CHRISTOPHERSIOMYIA, STEGOMYIA)

The Fauna of British India,
including Ceylon and Burma.

Published under the Authority of the Secretary of State for India in Council.

LIST OF VOLUMES PUBLISHED AND IN PREPARATION.
FEBRUARY, 1934.

*(Those marked * are out of print. Except where publication is known to have been earlier, dates quoted are those on which the volumes were first received at the India Office.)*

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*Part I. [Primates, Carnivora, Insectivora]. Pp. i–xii, 1–250, text-figs. Aug. 31, 1888.

*Part II. [Chiroptera, Rodentia, Ungulata, Cetacea, Sirenia, Edentata]. Pp. i–xx, 251–617, text-figs. Dec. 18, 1891.

[*A second edition, by* Mr. MARTIN A. C. HINTON *and* Mr. R. I. POCOCK, *is in course of preparation. This edition will probably occupy three volumes.*]

BIRDS.

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*Vol. II. [Passeres, concluded]. By EUGENE W. OATES. Pp. i–x, 1–407, text-figs. Dec. 8, 1890.

Vol. III. [Eurylæmi, Pici, Zygodactyli, Anisodactyli, Macrochires, Trogones, Coccyges, Psittaci, Striges, Accipitres]. By W. T. BLANFORD. Pp. i–xiv, 1–450, text-figs. 21/- Oct. 2, 1895.

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[*A second edition, by* Dr. SUNDER LAL HORA, *is in course of preparation. It is anticipated that this edition will extend to at least five volumes.*]

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[*Dates of publication as stated in MS. notes by* Sir G. Hampson, "teste Taylor & Francis."]

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[*Vol. III. of the first edition was never completed. A second edition, by* Mr. N. D. RILEY *and* Brig.-Gen. W. H. EVANS, *is in course of preparation. This edition will embrace all the butterflies and will probably extend to five volumes.*]

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